

# **COURSE SPECIFICATIONS**

**Faculty of Pharmacy**

**Bachelor of Pharmacy**

**Third Year – First Term**

**2017-2018**

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# **COURSE SPECIFICATIONS**

**Biochemistry (1)**

**Third year – First Term**

**2017 -2018**

## Course Specification of Biochemistry (1)

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University: **Zagazig** Faculty: **Pharmacy**

### A- Course specifications:

Program(s) on which the course is given: Bachelor of Pharmacy

Major or Minor element of programs: Major

Department offering the program: -----

Department offering the course: Biochemistry Department

Academic year/Level: Third year/First term

Date of specification approval: 25 September 2017

### B- Basic information:

Title: Biochemistry (1)

Code: BC310

Credit Hours: ---

Lectures : 2 hrs/week

Practical: 2 hrs/week

Tutorials: ---

Total: 3 hrs/week

### C- Professional information:

#### 1-Overall Aims of the Course:

On completion of the course, students will be able to illustrate chemistry and functions of carbohydrate, proteins and Enzymes as well as the principles of bioenergetics, oxidative phosphorylation and porphyrin pathways.

## 2-Intended Learning Outcomes of Biochemistry (1) (ILOs):

<b>A- Knowledge and Understanding</b>	
a1	Explain the principles of electron transport chain and oxidative phosphorylation.
a2	Outline classification of enzymes and their mode of action.
a3	Illustrate chemistry of different food staff.
a4	Summarize importance of carbohydrates, proteins and lipids and their role in maintaining body functions.
a5	Identify synthesis and degradation of hemoglobin and the associated disorders
a6	Define the laboratory diagnosis of porphyrin disorders.
<b>B- Professional and Practical skills</b>	
b1	Handle basic laboratory equipments and chemicals effectively and safely.
b2	Identify different classes of food staff.
b3	Perform laboratory tests for biological samples to detect different diseases.
<b>C- Intellectual skills</b>	
c1	Select the appropriate method for differentiation between different classes of carbohydrates.
c2	Choose the appropriate method for differentiation between types of fatty acids.
c3	Assess different methods used for determination of heme disorders.
c4	Analyze and interpret quantitative data in a suitable form.
c5	Compare between different classes of food staff and enzymes.
<b>D- General and Transferable skills</b>	
d1	Work effectively as a member of a team.
d2	Manage time to achieve targets within deadlines.
d3	Write and present reports.
d4	Develop critical thinking, and problem-solving skills.

## D- Contents:

Week No.	Lecture (2hrs/week)	Practical session (2hrs/week)
<b>1</b>	<ul style="list-style-type: none"><li>- Biological oxidation.</li><li>- Substrate level phosphorylation</li><li>-Oxidative phosphorylation.</li></ul>	<ul style="list-style-type: none"><li>- Laboratory Safety Measures</li></ul>
<b>2</b>	<ul style="list-style-type: none"><li>- Electron transport chain</li><li>-Uncouplers</li><li>- Energy gain from glucose oxidation in cells .</li></ul>	<ul style="list-style-type: none"><li>-Introduction about biochemistry</li></ul>
<b>3</b>	<ul style="list-style-type: none"><li>-Enzymes structure</li><li>-Properties of enzymes</li><li>- Enzymes: mechanism of actions and coenzymes</li></ul>	<ul style="list-style-type: none"><li>- Separation of serum and plasma</li></ul>
<b>4</b>	<ul style="list-style-type: none"><li>- Factors affecting reaction velocity</li><li>- Inhibition of enzyme activity</li><li>- Regulation of enzyme activity</li></ul>	<b>- Activity-1</b>
<b>5</b>	<ul style="list-style-type: none"><li>- Correlation of enzymes with diseases</li></ul>	<b>- Activity-2</b>
<b>6</b>	Midterm exam	
<b>7</b>	<ul style="list-style-type: none"><li>- Chemistry of heme</li><li>-Regulation of heme metabolism and metabolic disorders</li></ul>	
<b>8</b>	<ul style="list-style-type: none"><li>- Structure and classification of amino acids</li><li>- Acidic and basic properties of amino acids</li><li>- Structure of proteins</li></ul>	<ul style="list-style-type: none"><li>- Qualitative tests for total protein</li></ul>

<b>9</b>	<ul style="list-style-type: none"> <li>- Functions of proteins</li> <li>- Plasma proteins</li> <li>- Definition and function of lipids</li> <li>- Classification of lipids</li> </ul>	- Qualitative tests for total protein
<b>10</b>	<ul style="list-style-type: none"> <li>- Functions of proteins</li> <li>- Plasma proteins</li> <li>- Definition and function of lipids</li> <li>- Classification of lipids</li> </ul>	- Quantitative determination of total protein
<b>11</b>	<ul style="list-style-type: none"> <li>- Distribution of lipids in the body</li> <li>- Types of fatty acids and essential fatty acids</li> </ul>	- Qualitative tests for lipids
<b>12</b>	<ul style="list-style-type: none"> <li>- Definition and functions of carbohydrates</li> <li>- Classification of carbohydrates (monosaccharides, disaccharides, oligosaccharides examples with structure)</li> </ul>	-Quantitative determination of serum glucose
<b>13</b>	<ul style="list-style-type: none"> <li>- Polysaccharides: examples and classification</li> <li>- Physical and chemical properties of carbohydrates</li> </ul>	<b>sheet</b>
<b>14</b>	- Revision	Practical exam
<b>15</b>	- Open discussion	

### **E- Teaching and Learning Methods:**

- Lectures
- Practical sessions
- Self learning (Activities, open discussion)

## **F- Student Assessment Methods:**

- 1- Written exam to assess a1, a2, a3, a4, a5, a6, c3, c5
- 2- Activity to assess d1, d2, d3, d4
- 3- Practical exam to assess b1, b2, b3, c1, c2, c4, d1, d2, d3, d4
- 4- Oral exam to assess a1, a2, a3, a4, a5, a6, c3, c5, d4

### **Assessment schedule:**

<b>Assessment (1):</b> Written exams	Week 6,16
<b>Assessment (2):</b> Activity	Week 4,5
<b>Assessment (3):</b> Practical exams	Week 14
<b>Assessment (4):</b> Oral exams	Week 16

### **Weighting of Assessment:**

<b>Assessment method</b>	<b>Marks</b>	<b>Percentage</b>
<b>Written exam</b>	60	60%
<b>Practical exam and activities</b>	25	25%
<b>Oral exam</b>	15	15%
<b>TOTAL</b>	100	100%

## **G- Facilities Required for Teaching and Learning:**

- Black (white) board, Data show, Laboratory equipment (water bath, spectrophotometer, centrifuge) and Chemicals.

## **H- List of References:**

**1- Course Notes:** Student book of Biochemistry (1) approved by biochemistry department (2017).

- Practical notes of Biochemistry (1) approved by biochemistry department (2017).

### **2- Essential books:**

i- Basic concepts in biochemistry; Gilbert H.F.; The Mc Graw Hill companies Inc. (2000).

ii- Marks' basic medical biochemistry: a clinical approach (third edition); Lieberman M., Marks A.D., Smith C.M. (2008).



iii- Lehninger principles of biochemistry (fourth edition); Nelson D.L., Cox M.M., Freeman W.H. (2005).

### **3- Recommended books:**

i- Biochemistry (third edition); Garrett R.H. and Grisham C.M.; Thomson learning, Inc (2005).

ii- Clinical Biochemistry made ridiculously simple; Stephen Goldberg. M.D.; Med Master Inc. (2000).

iii- Harper's Illustrated Biochemistry (28<sup>th</sup> edition); Murray R.K., Bender D.A., Botham K.M., Kennelly P.J., Rodwell V.W., Weil P.A.; The McGraw Hill companies Inc. (2009).

### **4- Periodicals and websites:**

Egyptian J. of biochem. and molecular biology.

Egyptian J. of Pharmaceutical sciences.

Arab J. of Laboratory Medicine,

J. of Cardiovascular diseases.

[www.Pubmed.Com](http://www.Pubmed.Com)

[www.sciencedirect.com](http://www.sciencedirect.com).

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**Course Coordinator: Prof. Dr. SouSou Ibrahim**

**Head of Department: Prof. Dr. Sahar elswefy**

**Date: 2017 / 9 / 25 تم مناقشة و اعتماد توصيف المقرر من مجلس القسم بتاريخ**  
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## Matrix I of Biochemistry 1 course

Matrix I of Biochemistry 1 course																			
Course Contents		ILOs of Biochemistry 1 course																	
		Knowledge and understanding						Professional and practical skills			Intellectual skills					General and transferable skills			
Lectures		a1	a2	a3	a4	a5	a6	b1	b2	b3	c1	c2	c3	c4	c5	d1	d2	d3	d4
1	- Biological oxidation. - Substrate level phosphorylation - Oxidative phosphorylation	x	x																
2	- Electron transport chain - Uncouplers - Energy gain from glucose oxidation in cells .	x																	
3	Mechanism of action of enzymes- coenzymes- factors affecting reaction velocity		x																
4	Inhibition of enzyme activity and regulation		x																
5	Correlation of enzymes with disease- Functions and classification of carbohydrates		x	x	x														
6	Classification of polysaccharides- physical and chemical properties of carbohydrates			x											x				
7	Structure and classification of amino acids - acidic and basic properties of amino acids			x															
8	Structure of proteins			x															
9	Functions of proteins- plasma proteins- functions and classification of lipids			x	x														
10	Distribution of lipids in the body- types of fatty acids			x	x														
11	Chemistry of porphyrins					x													
12	Metabolism of porphyrins and related diseases.					x	x						x						

[illegible]

## Matrix II of Biochemistry 1 course

National Academic Reference Standards (NARS)		Program ILOs	Course ILOs	Course contents	Sources	Teaching and learning methods			Method of assessment		
						Lecture	Practical session	Self learning	Written exam	Practical exam	Oral exam
2.1	Principles of basic, pharmaceutical, medical, social, behavioral, management, health and environmental sciences as well as pharmacy practice.	A4	a1	- Electron transport chain - Uncouplers - Energy gain from glucose oxidation in cells .	Student book	x			x		x
				Oxidative phosphorylation	Student book Essential books	x			x		x
			a2	Enzyme structure-enzyme properties	Student book	x			x		x
				Mechanism of action of enzymes-coenzymes-factors affecting reaction velocity	Student book Essential books Internet	x		x	x		x
				Inhibition of enzyme activity and regulation	Student book Essential books	x			x		x

				Correlation of enzymes with disease	Student book Essential books	x			x		x
			a3	Classification of carbohydrates	Student book	x			x		x
				Classification of polysaccharides-physical and chemical properties of carbohydrates	Student book	x			x		x
				Structure and classification of amino acids - acidic and basic properties of amino acids	Student book	x			x		x
				Structure of proteins	Student book	x			x		x
				Types of fatty acids	Student book	x			x		x
				Classification of lipids	Student book	x			x		x
			a4	Correlation of enzymes with disease	Student book Essential books	x			x		x
				Functions of proteins and plasma proteins	Student book	x			x		x
				Distribution of lipids in the body	Student book	x			x		x

2.11	Principles of body function in health and disease states as well as basis of genomic and different biochemical pathways regarding their correlation with different diseases.	A 24	a5	Chemistry of porphyrins	Student book	x			x		x
		A 25		Metabolism of porphyrins and related diseases.	Student book Essential books	x			x		x
2.12	Etiology, epidemiology, laboratory diagnosis and clinical features of different diseases and their pharmacotherapeutic approaches	A 28	a6	Metabolism of porphyrins and related diseases.	Student book Essential books	x			x		x
3.2	Handle and dispose chemicals and pharmaceutical preparations safely	B2	b1	Laboratory safety measures	Practical notes		x			x	
3.4	Extract, isolate, synthesize, purify, identify, and/or standardize	B6	b2		Practical notes		x			x	

	active substances from different origins.			Qualitative tests for lipids	Practical notes		x			x	
3.6	Monitor and control microbial growth and carry out laboratory tests for identification of infectious and non-infectious diseases.	B9	b3	Quantitative determination of blood glucose  Quantitative determination of total protein	Practical notes		x			x	
4.3	Apply qualitative and quantitative analytical and biological methods for QC and assay of raw materials as well as pharmaceutical preparations	C4	c3	Metabolism of porphyrins and related diseases.	Student book	x			x		
4.5	Select the appropriate methods of	C8	c1	Quantitative determination of blood glucose	Practical notes		x			x	

	isolation, synthesis, purification, identification, and standardization of active substances from different origins.		c2	Qualitative tests for lipids	Practical notes		x			x	
4.13	Analyze and interpret experimental results as well as published literature	C16	c4	Separation of plasma and serum	Practical notes		x			x	
			c5	Classification of polysaccharides-physical and chemical properties of carbohydrates	Student book	x			x		x
5.3	Work effectively in a team	D4	d1	Activity	Internet Recommended books		x	x		x	
5.4	Use numeracy, calculation and statistical methods as well as information technology tools	D5	d3	Activity	Internet Recommended books		x	x		x	



5.8	Demonstrate creativity and time management abilities	D10	d2	Activity	Internet Recommended books			x		x		-----
5.9	Implement writing and presentation skills	D11	d3	Activity	Internet Recommended books			x		x		-----
5.10	Demonstrate critical thinking, problem-solving and decision-making abilities	D12	d4	Revision- Open discussion	Student book Internet Recommended books	x		x			x	-----
				Activity	Internet Recommended books		x	x		x		-----

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**Course Coordinator: Prof. Dr. SouSou Ibrahim**

**Head of Department: Prof. Dr. Sahar elswefy**

**Date:** تم مناقشة و اعتماد توصيف المقرر من مجلس القسم بتاريخ 25 / 9 / 2017 م

# **COURSE SPECIFICATIONS**

**Biopharmaceutics and**

**Pharmacokinetics**

**Third year – First Term**

**2017-2018**

## **Course specification of Biopharmaceutics and Pharmacokinetics**

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**University:** Zagazig

**Faculty:** Pharmacy

### **A- Course specifications:**

Program (s) on which the course is given: Bachelor of pharmacy

Major or Minor element of programs: Major

Department offering the program: -----

Department offering the course: Pharmaceutics Department

Academic year Level: Third year/First semester

Date of specification approval: 3 September 2017

### **B- Basic information:**

Title: Biopharmaceutics and pharmacokinetics Code: PC314

Credit Hours: ---

Lectures: 2 hrs/week

Practical: 2 hrs/week

Tutorials: ---

Total: 3 hrs/week

### **C- Professional information:**

#### **1-Overall aim of the course**

On completion of the course, the student will be able to describe different orders of chemical reactions, the principles of biopharmaceutics including drug absorption, distribution, metabolism and excretion as well as pharmacokinetics principles.

## 2- Intended Learning Outcomes of biopharmaceutics and pharmacokinetics (ILO's):

<b>A- Knowledge and Understanding</b>	
a1	Enumerate different factors affecting drug stability
a2	Describe the effects of different factors on the rate of absorption, distribution, biotransformation and elimination of drugs.
a3	Illustrate different pharmacokinetic parameters and bioavailability
a4	Summarize methods of determination of pharmacokinetic parameters and order of reactions
<b>B- Professional and Practical skills</b>	
b1	Calculate rate constants and half lives of chemical reactions
b2	Calculate absorption and elimination parameters following oral administration and IV infusion
b3	Calculate drug pharmacokinetic parameters including Cl, Vd, T <sub>1/2</sub>
<b>C- Intellectual skills</b>	
c1	Differentiate between one compartmental and multiple compartmental models of drug distribution
c2	Interpret different drug pharmacokinetic data following oral administration and IV infusion
<b>D- General and Transferable skills</b>	
d1	Use information technology to collect and present data
d2	Develop critical thinking, problem-solving and decision-making abilities.
d3	Deliver course activities in due time
d4	Work effectively as a member of a team

## D- Contents:

Week No.	Lecture contents (2 hrs/week)	Practical session (2 hrs/week)
1	Types of orders of chemical reactions: Zero order First order Second order	Types of orders of chemical reactions
2	<ul style="list-style-type: none"> <li>• Determination of the order of chemical reaction</li> <li>• Factors affecting drug stability</li> <li>• Accelerated stability testing</li> </ul>	Problem solving
3	One compartmental model of drug distribution	IV bolus one compartmental model
4	Two compartmental model of drug distribution	Problem solving
5	Drug pharmacokinetics following single oral drug administration	Drug pharmacokinetics following single oral dose
6	Midterm exam	
7	Steady state principle after constant iv infusion	Drug pharmacokinetics following single oral dose
8	Drugs Absorption <ul style="list-style-type: none"> <li>- Passage of drugs across membranes</li> <li>- Membrane Structure</li> <li>- Methods of passage of drugs across cell membranes</li> <li>- Passive Diffusion</li> <li>- Factors affecting Passive absorption               <ul style="list-style-type: none"> <li>- Acidity &amp; Base ionization</li> <li>- Lipid &amp; water solubility of drugs</li> </ul> </li> <li>- Active Diffusion</li> <li>- Specialized transport of drugs</li> </ul>	Calculation of absorption rate constant
9	Factors affecting drug absorption	Problem solving
10	Distribution of drugs: <ul style="list-style-type: none"> <li>- Importance of blood flow to tissues</li> <li>- Role of blood brain barrier</li> <li>- Placental transfer of drugs</li> <li>- Mammary transfer of drugs</li> <li>- Redistribution of drugs</li> <li>- Role of plasma protein binding &amp; importance</li> </ul>	Bioavailability and bioequivalence
11	Drugs Metabolism <ul style="list-style-type: none"> <li>- Sites of drug metabolism</li> <li>- Relationships of phase I and phase II reactions in drug biotransformation</li> <li>- Phase I reactions</li> <li>- Phase II reactions</li> <li>- Enzyme induction</li> <li>- Enzyme inhibition</li> </ul>	Steady state principle after constant IV infusion

<b>12</b>	<ul style="list-style-type: none"> <li>- Effects of genetic factors on biotransformation</li> <li>- Effects of environmental factors on biotransformation</li> <li>- Effects of age and sex on biotransformation</li> <li>- Drug-drug interactions during metabolism</li> <li>- Effects of diseases on drug biotransformation</li> </ul>	Steady state principle after multiple IV infusion
<b>13</b>	Drug excretion	Drug elimination Activity
<b>14</b>	Revision	Practical exam
<b>15</b>	open discussion	Practical exam

### **E- Teaching and Learning Methods:**

- Lectures
- Practical session
- Self learning (Activities, open discussion)

### **F- Student Assessment methods:**

1-Written exams to assess: a1, a2, a3, a4, c1, c2

2- Activity to assess: d1, d2, d3, d4

3-Practical exams to assess: b1, b2, b3

4-Oral exam to assess: a1, a2, a3, a4, c1, c2

### **Assessment schedule**

<b>Assessment (1):</b> Written exams	Week 6,16
<b>Assessment (2):</b> Activity	Week 13
<b>Assessment (3):</b> Practical exams	Week 14, 15
<b>Assessment (4):</b> Oral exams	Week 16

### **Weighting of Assessment**

<b>Assessment method</b>	<b>Marks</b>	<b>Percentage</b>
<b>Written exam</b>	60	60%
<b>Practical exam and activities</b>	25	25%

<b>Oral exam</b>	15	15%
<b>TOTAL</b>	100	100%

### **G- Facilities required for teaching and learning:**

For lectures: Black (white) boards, data show

For labs: well aerated and well seated labs

### **H- List of References:**

**1- Course Notes:** Student book of Biopharmaceutics and pharmacokinetics approved by pharmaceutics department (2017)

#### **2- Essential Books:**

Basic & Clinical Pharmacokinetics by Micheal E.Winter published by Lippincot and Williams. 4th Edition.

Malcolm Rowland & Thomas N. Tozer, Clinical Pharmacokinetics Concepts and Applications 3rd ed. Lea & Febiger Philadelphia, 1995

Milo Gibaldi, Biopharmaceutics and Clinical Pharmacokinetics, 4th ed. Lea & Febiger, Philadelphia 1991

#### **3- Recommended Books**

www.speciation.net Applied Biopharmaceutics & Pharmacokinetics  
Leon Shargel/Andrew Yu, 5th Edition, Applenton & Lange

#### **4- Periodicals and websites:**

Animations from www.icp.org.nz are used in this course to enhance students learning as class room discussion.

[www.boomer.org](http://www.boomer.org)

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Course Coordinator: Dr. Gehan Fathy Attia

• Head of Department: Prof. Nagia Ahmed El-Megrab

Date: تم مناقشة و اعتماد توصيف المقرر من مجلس القسم بتاريخ 3 / 9 / 2017م

## Matrix I of Biopharmaceutics and Pharmacokinetics Course

Course Contents		ILOs of Biopharmaceutics and Pharmacokinetics course												
		Knowledge and understanding				Professional and practical skills			Intellectual skills		Transferable and general skills			
Lectures		a1	a2	a3	a4	b1	b2	b3	c1	c2	d1	d2	d3	d4
1	Types of orders of chemical reactions: Zero order First order Second order				x									
2	<ul style="list-style-type: none"><li>• Determination of the order of chemical reaction</li><li>• Factors affecting drug stability</li><li>• Accelerated stability testing</li></ul>	x												
3	One compartmental model of drug distribution			x	x				x					
4	Two compartmental model of drug distribution			x	x				x					
5	Drug pharmacokinetics following single oral drug administration			x	x					x				
6	Steady state principle after constant iv infusion			x	x					x				
7	Drugs Absorption - Passage of drugs across membranes - Membrane Structure - Methods of passage of drugs across cell membranes - Passive Diffusion - Factors affecting Passive absorption - Acidity & Base ionization - Lipid & water solubility of drugs		x											



	- Active Diffusion - Specialized transport of drugs													
8	Factors affecting drug absorption		x											
9	Distribution of drugs: - Importance of blood flow to tissues - Role of blood brain barrier - Placental transfer of drugs - Mammary transfer of drugs - Redistribution of drugs - Role of plasma protein binding & importance													
10	Drugs Metabolism - Sites of drug metabolism - Relationships of phase I and phase II reactions in drug biotransformation - Phase I reactions - Phase II reactions - Enzyme induction - Enzyme inhibition		x						x					
11	- Effects of genetic factors on biotransformation - Effects of environmental factors on biotransformation - Effects of age and sex on biotransformation - Drug-drug interactions during metabolism - Effects of diseases on drug biotransformation		x											
12	Drug excretion		x											
<b>Practical Sessions</b>														
13	Types of orders of chemical reactions					x						x	x	x
14	IV bolus one compartmental model						x					x	x	x
15	Drug pharmacokinetics following single oral dose							x				x	x	x
16	Calculation of absorption rate constant						x					x	x	x
17	Bioavailability and bioequivalence							x				x	x	x

18	Steady state principle after constant IV infusion						x					x	x	x
19	Steady state principle after multiple IV infusion						x					x	x	x
20	Drug elimination							x				x	x	x
21	Activity										x	x	x	x

## Matrix II of Biopharmaceutics and Pharmacokinetics course

National Academic Reference Standards (NARS)		Program ILOs	Course ILOs	Course contents	Sources	Teaching and learning methods		Method of assessment		
						Lecture	Practical session	Written exam	Practical exam	Oral exam
2.1	Principles of basic, pharmaceutical, medical, social, behavioral, management, health and environmental sciences as well as pharmacy practice.	A2	a1	Determination of the order of chemical reaction <ul style="list-style-type: none"> <li>Factors affecting drug stability</li> <li>Accelerated stability testing</li> </ul>						
2.8	Principles of pharmacokinetics and biopharmaceutics with applications in therapeutic drug monitoring, dose modification and bioequivalence studies.	A.19	a2	Drugs Absorption <ul style="list-style-type: none"> <li>- Passage of drugs across membranes</li> <li>- Membrane Structure</li> <li>- Methods of passage of drugs across cell membranes</li> <li>- Passive Diffusion</li> <li>- Factors affecting Passive absorption               <ul style="list-style-type: none"> <li>- Acidity &amp; Base ionization</li> <li>- Lipid &amp; water solubility of drugs</li> </ul> </li> <li>- Active Diffusion</li> </ul>	Student book Essential books	x		x		x

			Factors affecting drug absorption	Student book Essential books	x		x		x
			Distribution of drugs: - Importance of blood flow to tissues - Role of blood brain barrier - Placental transfer of drugs - Mammary transfer of drugs - Redistribution of drugs - Role of plasma protein binding & importance	Student book Essential books	x		x		x
			Drugs Metabolism - Sites of drug metabolism - Relationships of phase I and phase II reactions in drug biotransformation - Phase I reactions - Phase II reactions - Enzyme induction - Enzyme inhibition	Student book Essential books	x		x		x
			Effects of genetic factors on biotransformation - Effects of environmental factors on biotransformation - Effects of age and sex on biotransformation - Drug-drug interactions during metabolism - Effects of diseases on drug biotransformation	Student book Essential books	x		x		x
			Drug excretion	Student book Essential books	x		x		x

			a3	One compartmental model of drug distribution	Student book	x		x		x
				Two compartmental model of drug distribution	Essential books					
				Drug pharmacokinetics following single oral drug administration	Student book	x		x		x
				Steady state principle after constant iv infusion	Essential books					
			a4	Types of orders of chemical reactions: Zero order First order Second order	Student book Essential books	x		x		x
			b1	Types of orders of chemical reactions	Practical notes		x		x	
			b2	IV bolus one compartmental model	Practical notes		x		x	
			b3	Drug pharmacokinetics following single oral dose	Practical notes		x		x	
				Calculation of absorption rate constant	Practical notes		x		x	
				Bioavailability and bioequivalence	Practical notes		x		x	
				Steady state principle after constant IV infusion	Practical notes		x		x	
				Steady state principle after multiple IV infusion	Practical notes		x		x	

				Drug elimination	Practical notes		x		x	
4.10	Calculate and adjust dosage and dose regimen of medications.	C.13	c1	One compartmental model of drug distribution	Student book Essential books	x		x		x
				Two compartmental model of drug distribution						
			c2	Drug pharmacokinetics following single oral drug administration	Student book Essential books	x		x		x
				Steady state principle after constant iv infusion	Student book Essential books	x		x		x
5.3	Work effectively in a team.	D4	d4	Types of orders of chemical reactions	Practical notes		x		x	
5.8	Demonstrate creativity and time management abilities.	D10	d3	IV bolus one compartmental model	Practical notes		x		x	
5.9	Implement writing and presentation skills.	D.11	d1	Drug pharmacokinetics following single oral dose	Practical notes		x		x	
5.10	Implement writing and thinking, problem-solving and decision-	D.12	d2	Calculation of absorption rate constant	Practical notes		x		x	

	making abilities.			Bioavailability and bioequivalence	Practical notes and Internet		x		x	
				Steady state principle after constant IV infusion	Practical notes		x		x	
				Steady state principle after multiple IV infusion	Practical notes		x		x	
				Drug elimination	Practical notes		x		x	
				Activity	Internet			x	x	

Course Coordinator: Dr. Gehan Fathy Attia

• Head of Department: Prof. Nagia Ahmed El-Megrab

Date: تم مناقشة و اعتماد توصيف المقرر من مجلس القسم بتاريخ 3 / 9 / 2017م

# **COURSE SPECIFICATIONS**

## **Pharmaceutical Microbiology**

**Third year – First Term**

**2017-2018**



## Course Specification of Pharmaceutical Microbiology

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**University:** Zagazig **Faculty:** Pharmacy

### A- Course specifications:

Program(s) on which the course is given: Bachelor of Pharmacy

Major or Minor element of programs: Major

Department offering the program: -----

Department offering the course: Microbiology & Immunology

Department

Academic year/ level: Third year/ First term

Date of specification approval: 25/12/ 2017

### B- Basic information:

Title: Pharmaceutical Microbiology **Code: MI311**

Credit Hours: ---

Lectures : 2 hrs/week

Practical: 2 hrs/week

Tutorials: ---

Total: 3 hrs/week

## **C- Professional information:**

### **1-Overall Aims of the Course:**

**On completion of the course, students will be able to** demonstrate the different types of antimicrobial agents, sources, standardization tests and control of microbial contamination of the pharmaceutical products and outline the concepts, methods and applications of sterilization as well as sterility testing.

## 2-Intended Learning Outcomes of Pharmaceutical Microbiology (ILOs):

<b>A- Knowledge and Understanding</b>	
a1	Outline different types of antimicrobial agents and their mechanism of action.
a2	Describe the properties and functions of preservative in pharmaceutical preparations.
a3	Outline the basic concepts of sterilization, its different methods and its applications
<b>B- Professional and Practical skills</b>	
b1	Use the proper terms of microbiology.
b2	Handle basic biohazards and chemicals effectively and safely.
b3	Advise health care professionals and patients for rational use of drugs and problems of misuse of antimicrobial agents
<b>C- Intellectual skills</b>	
c1	Select the appropriate preservative for effective formulation of pharmaceutical preparations.
c2	Apply GMP guidelines in preparation of pharmaceutical products.
c3	Choose the suitable antimicrobial agent for each infection.
<b>D- General and Transferable skills</b>	
d1	Develop communications skills with public, patients and other health care professionals.
d2	Work effectively as a member of a team.
d3	Write and present reports

## D- Contents:

Week No.	Lecture (3hrs/week)	Practical session (2.5hrs/week)
<b>1</b>	<ul style="list-style-type: none"> <li>- Introduction</li> <li>- Definition and terminology</li> <li>- Antibiotic and chemotherapeutic agents</li> <li>- Mechanisms of action of antimicrobial agents</li> </ul>	<ul style="list-style-type: none"> <li>- Laboratory safety measures</li> <li>- Bacterial counts: total count, viable count</li> </ul>
<b>2</b>	Classification of antimicrobial agents: <ul style="list-style-type: none"> <li>- Drugs acting on cell wall</li> <li>- Drugs acting on cell membrane</li> </ul>	<ul style="list-style-type: none"> <li>- Antibiotic susceptibility testing: Kirby-Bauer method</li> </ul>
<b>3</b>	Classification of antimicrobial agents: <ul style="list-style-type: none"> <li>- Drugs inhibiting protein Synthesis</li> <li>- Drugs inhibiting nucleic acid Synthesis</li> <li>- Antimetabolites</li> </ul>	<ul style="list-style-type: none"> <li>- Demonstration of spectrum of action by strip-plate method</li> <li>- Demonstration of interaction between two antimicrobial agents</li> </ul>
<b>4</b>	<ul style="list-style-type: none"> <li>- Antituberculous drugs</li> <li>- Antileprosy agents</li> <li>- Antifungal drugs</li> <li>- Antiprotozoal drugs</li> <li>- Antiviral drugs</li> <li>- Microbial resistance to antimicrobial agents</li> <li>- Microbial assay of Antibiotics and vitamins</li> </ul>	<ul style="list-style-type: none"> <li>- Determination of Minimum inhibitory concentration (M.I.C.) by broth dilution method</li> </ul>
<b>5</b>	<ul style="list-style-type: none"> <li>- Disinfection and antisepsis</li> <li>- Chemical agents used as disinfectant and antiseptic</li> </ul>	<ul style="list-style-type: none"> <li>- Determination of Minimum inhibitory concentration (M.I.C.) by Agar diffusion method</li> <li>- Activity (Report)</li> </ul>
<b>6</b>	midterm exam	
<b>7</b>	<ul style="list-style-type: none"> <li>- Factors affecting the activity of disinfectant and antiseptic</li> <li>- Evaluation of disinfectant and antiseptic</li> </ul>	<ul style="list-style-type: none"> <li>- Antibiotic assay</li> </ul>
<b>8</b>	<ul style="list-style-type: none"> <li>- Sources of microbial</li> </ul>	<b>Practical exam (1)</b>

	contamination and spoilage of pharmaceutical products and factors affecting them	
<b>9</b>	<ul style="list-style-type: none"> <li>- Control of microbial spoilage</li> <li>- Good Manufacture Practice</li> </ul>	<ul style="list-style-type: none"> <li>- Determination of temperature coefficient</li> </ul>
<b>10</b>	<ul style="list-style-type: none"> <li>- Preservation of pharmaceutical products and preservatives commonly used</li> <li>- Factors affecting preservative activity</li> <li>- Evaluation of preservative's efficacy</li> </ul>	<ul style="list-style-type: none"> <li>- Determination of concentration exponent</li> </ul>
<b>11</b>	<ul style="list-style-type: none"> <li>- Control of microorganisms by sterilization and survival curve</li> </ul>	<ul style="list-style-type: none"> <li>- Preparation of heat killed vaccine</li> </ul>
<b>12</b>	<ul style="list-style-type: none"> <li>- sterilization parameters and sterility assurance</li> </ul>	<ul style="list-style-type: none"> <li>- Determination of phenol-coefficient: Rideal-Walker method</li> <li>- Activity (Report)</li> </ul>
<b>13</b>	<ul style="list-style-type: none"> <li>- Methods of sterilization and sterilizers</li> </ul>	<ul style="list-style-type: none"> <li>- Determination of phenol-coefficient: Chick-Martin method</li> </ul>
<b>14</b>	<ul style="list-style-type: none"> <li>- Applications of sterilization</li> </ul>	<ul style="list-style-type: none"> <li>- Sterilization: Methods of sterilization in laboratory</li> </ul>
<b>15</b>	<ul style="list-style-type: none"> <li>- Sterilization of pharmaceutical products</li> <li>- Sterilization control and sterility testing</li> </ul>	<ul style="list-style-type: none"> <li>- <b>Practical exam (2)</b></li> </ul>

## **E- Teaching and Learning Methods:**

- Lectures
- Practical sessions
- Self learning (activities, reports, open discussion, internet search.....)

## **F- Student Assessment Methods:**

- 1- Written exam to assess a1, a2, a3, c1, c2, c3
- 2- Activity to assess d2,d3
- 3- Practical exam to assess b1, b2, b3, b4, c3, d1, d2, d3
- 4- Oral exam to assess a1, a2, a3, c1, c2, c3, d1

### **Assessment schedule:**

<b>Assessment (1):</b> Written exams	Week 6,16
<b>Assessment (2):</b> Activity	Week 5,12
<b>Assessment (3):</b> Practical exams	Week 8,15
<b>Assessment (4):</b> Oral exams	Week 16

### **Weighting of Assessment:**

<b>Assessment method</b>	<b>Marks</b>	<b>Percentage</b>
<b>Written exam</b>	60	60%
<b>Practical exam and activities</b>	25	25%
<b>Oral exam</b>	15	15 %
<b>TOTAL</b>	100	100%

## **G- Facilities Required for Teaching and Learning:**

1. For lectures: Black (white) boards and data show.
2. For Labs.: Chemicals, Autoclaves, Incubators, Ovens, Water bathes, staining dyes, microscopes, refrigerators and microbiological culture media

## **H- List of References:**

- 1- Student book of Pharmaceutical Microbiology approved by microbiology & immunology department (2017).

## **2- Essential Books (Text Books):**

- Jackson M, Lowey A. Handbook of extemporaneous preparation. A guide to pharmaceutical compounding. Published by Pharmaceutical Press, 2010.

## **3- Recommended Books:**

-Martindale, "The extra pharmacopeia". 31st edn., by James, E.F Reynolds. And Kathleen Parfitt, Royal Pharmaceutical Society, London (2007).

## **4- Periodicals and websites:**

Aquilina A. The extemporaneous compounding of paediatric medicines at Mater Dei Hospital. Journal of the Malta College of Pharmacy Practice. Issue 19, 28 – 30, 2013.

<http://canadianpharmacistsletter.therapeuticresearch.com/ce/ceCourse.asp>

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**Course Coordinator: Prof. Dr/ Fathy Serry**

**Head of Department: Prof. Dr. Nehal Elsayed Youssef**

**Date: 2017/ 12 / 25** تم مناقشة و اعتماد توصيف المقرر من مجلس القسم بتاريخ  
م

## Matrix I of Pharmaceutical Microbiology Course

Course Contents		ILOs of Pharmaceutical Microbiology course											
		Knowledge and understanding			Professional and practical skills			Intellectual skills			General and transferable skills		
		a1	a2	a3	b1	b2	b3	c1	c2	c3	d1	d2	d3
Lectures		a1	a2	a3	b1	b2	b3	c1	c2	c3	d1	d2	d3
1	Introduction Definition and terminology Antibiotic and chemotherapeutic agents Mechanisms of action of antimicrobial agents	x									x		
2	Classification of antimicrobial agents: Drugs acting on cell wall Drugs acting on cell membrane	x								x	x		
3	Drugs inhibiting protein synthesis Drugs inhibiting nucleic acid synthesis Antimetabolites	x								x	x		



4	Antituberculous drugs Antileprosy agents Antifungal drugs Antiprotozoal drugs Antiviral drugs Microbial resistance to antimicrobial agents Microbial assay of Antibiotics and vitamins	x		x						x		x	
5	• Disinfection and antiseptics • chemical agents used as disinfectant and antiseptic	x		x						x		x	
6	• Factors affecting the activity of disinfectant and antiseptic • Evaluation of disinfectant and antiseptic			x								x	
7	• Sources of microbial contamination and spoilage of pharmaceutical products and factors affecting them			x								x	
8	Control of microbial spoilage Good Manufacture Practice Preservation of pharmaceutical products and preservatives commonly used Factors affecting preservative activity Evaluation of preservative's efficacy	x	x	x	x				x	X		x	
9	Control of microorganisms by sterilization and survival curve			x								x	
10	sterilization parameters and sterility assurance			x								x	

11	Methods of sterilization and sterilizers			X								X	
12	Applications of sterilization			X								X	
13	Sterilization of pharmaceutical products			X								X	
14	Sterilization control and sterility testing			X								X	
<b>Practical sessions</b>													
16	Laboratory safety measures Bacterial counts: total count, viable count Sterility testing					X	X				X	X	X
17	Antibiotic susceptibility testing: Kirby-Bauer method						X	X			X	X	X
18	Demonstration of spectrum of action by strip-plate method Demonstration of interaction between two antimicrobial agents						X	X			X	X	X
19	Determination of Minimum inhibitory concentration (M.I.C.) by broth dilution						X	X			X	X	X

20	Determination of Minimum inhibitory concentration ( M.I.C.) by Agar diffusion method						X	X			X	X	X
21	Antibiotic assay						X	X			X	X	X
22	Determination of temperature coefficient						X				X		X
23	Determination of concentration exponent						X				X		X
24	Preparation of heat killed vaccine					X					X		X
25	Determination of phenol-coefficient: Rideal-Walker method					X	X	X			X	X	X
26	Determination of phenol-coefficient: Chick-Martin method					X	X	X			X	X	X
27	Activity (report)												X

**Matrix II of Pharmaceutical Microbiology Course**

National Academic Reference Standards (NARS)		Program ILOs	Course ILOs	Course contents	Sources	Teaching and learning methods			Method of assessment		
						Lecture	Practical session	Self learning	Written exam	Practical exam	Oral exam
2.1	Principles of basic, pharmaceutical, medical, social, behavioral, management, health and environmental sciences as well as pharmacy practice	A2	a1	Introduction Definition and terminology Antibiotic and chemotherapeutic agents Mechanisms of action of antimicrobial agents	Student book, Essential books	x			x		x
				Classification of antimicrobial agents: antibiotics and chemotherapeutic agents Antituberculous drugs Antileprosy agents Antifungal drugs Antiprotozoal drugs Antiviral drugs	Student book, Essential books	x			x		x

				Antituberculous drugs Antileprosy agents Antifungal drugs Antiprotozoal drugs Antiviral drugs Microbial resistance to antimicrobial agents Microbial assay of Antibiotics and vitamins	Student book, Essential books	x			x		x
				Disinfection and antisepsis Chemical agents used as disinfectant and antiseptic	Student book, Essential books	x			x		x
				Control of microbial spoilage Good Manufacture Practice Preservation of pharmaceutical products and preservatives commonly used Factors affecting preservative activity Evaluation of preservative's efficacy	Student book, Essential books	x			x		x
2.2	Physico-chemical properties of various substances used in preparation of medicines including inactive and active ingredients as well as	A9	a2	Control of microbial spoilage Good Manufacture Practice Preservation of pharmaceutical products and preservatives commonly used Factors affecting preservative activity Evaluation of preservative's efficacy	Student book, Essential books	x			x		x

	biotechnology and radio-labeled products										
2.10	Principles of public health issues including sources and control of microbial contamination as well as sanitation, disinfection, sterilization methods and microbiological QC of pharmaceutical products	A22	a3	Control of microorganisms by sterilization and survival curve	Student book, Essential books	x			x		x
				sterilization parameters and sterility assurance	Student book, Essential books	x			x		x
				Methods of sterilization and sterilizers	Student book, Essential books	x			x		x
				Applications of sterilization							
				Sterilization of pharmaceutical products							
		A23		Sterilization control and sterility testing							
3.1	Use the proper pharmaceutical and medical terms, abbreviations and symbols in pharmacy practice	B1	b1	Laboratory safety measures Bacterial counts: total count, viable count Sterility testing	Practical notes		x			x	
				Preparation of heat killed vaccine	Practical notes		x			x	
				Determination of phenol-coefficient: Rideal-Walker method	Practical notes		x			x	

				Determination of phenol-coefficient: Chick-Martin method	Practical notes		x			x	
3.2	Handle and dispose chemicals and pharmaceutical preparations safely	B2	b2	Laboratory safety measures Bacterial counts: total count, viable count Sterility testing	Practical notes		x			x	
3.4	Extract, isolate, synthesize, purify, identify, and /or standardize active substances from different origins	B6	b3	Antibiotic susceptibility testing: Kirby-Bauer method	Practical notes		x			x	
				Demonstration of spectrum of action by strip-plate method Demonstration of interaction between two antimicrobial agents	Practical notes		x			x	
				Determination of Minimum inhibitory concentration (M.I.C.) by broth dilution	Practical notes		x			x	
				Determination of Minimum inhibitory concentration ( M.I.C.) by Agar diffusion method	Practical notes		x			x	
				Antibiotic assay	Practical notes		x			x	
				Determination of temperature coefficient	Practical notes		x			x	
				Determination of concentration exponent	Practical notes		x			x	
				Determination of phenol-coefficient: Rideal-Walker method	Practical notes		x			x	

				Determination of phenol-coefficient: Chick-Martin method							
3.9	Maintain public awareness on rational use of drugs and social health hazards of drug abuse and misuse	B14			Practical notes		x			x	
4.1	Apply pharmaceutical knowledge in the formulation of safe and effective medicines as well as in dealing with new drug delivery systems	C1	c1	Control of microbial spoilage Good Manufacture Practice Preservation of pharmaceutical products and preservatives commonly used Factors affecting preservative activity Evaluation of preservative's efficacy	Student book, Essential books	x			X		x
4.2	Comprehend and apply GLP, GPMP, GSP and GCP guidelines in pharmacy practice	C3	c2	Control of microbial spoilage Good Manufacture Practice Preservation of pharmaceutical products and preservatives commonly used Factors affecting preservative activity Evaluation of preservative's efficacy	Student book, Essential books	x			X		x



4.8	Select and assess appropriate methods of infection control to prevent infections and promote public health	C11	c3	Classification of antimicrobial agents: - Drugs acting on cell wall - Drugs acting on cell membrane - Drugs inhibiting protein synthesis - Drugs inhibiting nucleic acid synthesis - Antimetabolites	Student book, Essential books	x				X		x
				Antituberculous drugs Antileprosy agents Antifungal drugs Antiprotozoal drugs Antiviral drugs Microbial resistance to antimicrobial agents Microbial assay of Antibiotics and vitamins	Student book, Essential books	x				X		x
				Disinfection and antisepsis chemical agents used as disinfectant and antiseptic	Student book, Essential books	x				X		x
				Control of microbial spoilage Good Manufacture Practice Preservation of pharmaceutical products and preservatives commonly used Factors affecting preservative activity Evaluation of preservative's efficacy	Student book, Essential books	x				X		x

5.1	Communicate clearly by verbal and means	D1	d1	Antibiotic susceptibility testing: Kirby-Bauer method	Practical notes		x			x	
				Determination of phenol-coefficient: Rideal-Walker method	Practical notes		×			×	
				Determination of phenol-coefficient: Chick-Martin method	Practical notes		×			×	
				Introduction Definition and terminology Antibiotic and chemotherapeutic agents Mechanisms of action of antimicrobial agents	Student book, Essential books	x					x
				Classification of antimicrobial agents: - Drugs acting on cell wall - Drugs acting on cell membrane - Drugs inhibiting protein synthesis - Drugs inhibiting nucleic acid synthesis - Antimetabolites	Student book, Essential books	x					x
				Antituberculous drugs Antileprosy agents Antifungal drugs Antiprotozoal drugs Antiviral drugs Microbial resistance to antimicrobial agents Microbial assay of Antibiotics and vitamins	Student book, Essential books	x					x

			Disinfection and antiseptics Chemical agents used as disinfectant and antiseptic	Student book, Essential books	x					x
			Factors affecting the activity of disinfectant and antiseptic Evaluation of disinfectant and antiseptic	Student book, Essential books	x					x
			Sources of microbial contamination and spoilage of pharmaceutical products and factors affecting them	Student book, Essential books	x					x
			Control of microbial spoilage Good Manufacture Practice Preservation of pharmaceutical products and preservatives commonly used Factors affecting preservative activity Evaluation of preservative's efficacy	Student book, Essential books	x					x
			Control of microorganisms by sterilization and survival curve	Student book, Essential books	x		x			x
			sterilization parameters and sterility assurance	Student book, Essential books	×					×
			Methods of sterilization and sterilizers	Student book, Essential books	×					×
			Applications of sterilization	Student book, Essential books	×					×

			Sterilization of pharmaceutical products	Student book, Essential books	×		×			×
			Sterilization control and sterility testing	Student book, Essential books	x					x
			Laboratory safety measures Bacterial counts: total count, viable count Sterility testing	Practical notes		x			x	
			Antibiotic susceptibility testing: Kirby-Bauer method	Practical notes		x			x	
			Demonstration of spectrum of action by strip-plate method Demonstration of interaction between two antimicrobial agents	Practical notes		x			x	
			Determination of Minimum inhibitory concentration (M.I.C.) by broth dilution	Practical notes		x			x	
			Determination of Minimum inhibitory concentration ( M.I.C.) by Agar diffusion method Activity	Practical notes		x			x	
			Antibiotic assay	Practical notes		x			x	
			Determination of phenol-coefficient: Rideal-Walker method	Practical notes		x			x	
			Determination of phenol-coefficient: Chick-Martin method	Practical notes		×			x	

5.3	Work effectively in a team	D4	d3	Laboratory safety measures Bacterial counts: total count, viable count Sterility testing	Practical notes		x				x	
				Antibiotic susceptibility testing: Kirby-Bauer method	Practical notes		x				x	
				Demonstration of spectrum of action by strip-plate method Demonstration of interaction between two antimicrobial agents	Practical notes		x				x	
				Determination of Minimum inhibitory concentration (M.I.C.) by broth dilution	Practical notes		x				x	
				• Determination of Minimum inhibitory concentration ( M.I.C.) by Agar diffusion method • Activity	Practical notes		x				x	
				Antibiotic assay	Practical notes		x				x	
				Determination of temperature coefficient	Practical notes		x				×	
				Determination of concentration exponent	Practical notes		x				x	
				Preparation of heat killed vaccine Activity	Practical notes Internet		x	x			x	
				Determination of phenol-coefficient: Rideal-Walker method	Practical notes		x				×	
				Determination of phenol-coefficient: Chick-Martin method	Practical notes		x				x	

				Activity	Internet and Recommended books		x	x		x	
5.9	Implement writing and presentation skills	D11	d2	Activity	Internet and Recommended books		x	x		x	

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**Course Coordinator: Prof. Dr/ Fathy Serry**

**Head of Department: Prof. Dr. Nehal Elsayed Youssef**

**Date:** 2017/ 12 / 25 م **تم مناقشة و اعتماد توصيف المقرر من مجلس القسم بتاريخ**

# **COURSE SPECIFICATIONS**

## **Pharmacology (1)**

**Third year – First Term**

**2017-2018**

## Course Specification of Pharmacology (1)

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**University:** Zagazig **Faculty:** Pharmacy

### A- Course specifications:

Program (s) on which the course is given: Bachelor of pharmacy  
Major or Minor element of programs: Major  
Department offering the course: Pharmacology and toxicology department  
Academic year I Level: Third year / First Term  
Date of specification approval: October 2017

### B- Basic information:

Title: Pharmacology-1 Code: PT312  
Credit hours: -----  
Lectures: 3 hrs/week  
Practical: 2 hrs/week  
Tutorials: ---  
Total: 4 hrs/week

### C- Professional information:

#### 1- Overall aim of the course:

On completion of the course, students will be able to define the principles of pharmacokinetics, pharmacodynamics, dose-response curve of drugs and pharmacological properties of drugs, affecting different organ systems.



## 2- Intended Learning Outcomes of Pharmacology (1) (ILOs):

<b>A- Knowledge and Understanding</b>	
a1	Outline the principles of pharmacology.
a2	Illustrate the principles of pharmacokinetics, pharmacodynamics and dose-response curve of drugs
a3	Define some mediators affecting body functions (autonomic nervous system and autacoids)
a4	Describe pharmacological properties of drugs, affecting different organ systems.
<b>B- Professional and Practical skills</b>	
b1	Perform laboratory safety measures.
b2	Apply techniques used in operating kymograph in order to perform <i>in vitro</i> experiments.
<b>C- Intellectual skills</b>	
c1	Select proper drugs for various diseases according to knowledge of physiology and pharmacology.
c2	Evaluate information from different sources in the field of pharmacology.
<b>D- General and Transferable skills</b>	
d1	Work effectively as a member of a team.

## D- Contents:

<b>Week No.</b>	<b>Lecture contents (3 hrs/ week)</b>	<b>Practical session (2 hrs/week)</b>
<b>1</b>	- Introduction to pharmacology	Drug development Types of pharmacological experiments
<b>2</b>	- Pharmacokinetics	Drug development Types of pharmacological experiments
<b>3</b>	- Pharmacodynamics	Concentration-effect curve of acetylcholine using the isolated rabbit intestine muscle (simulation)
<b>4</b>	Drug- drug interactions	Concentration-effect curve of acetylcholine using the isolated rabbit intestine muscle (simulation)
<b>5</b>	Adverse drug reactions	Concentration-effect curve of acetylcholine using the isolated rabbit intestine muscle (kymograph)
<b>6</b>	Midterm exam	
<b>7</b>	Autonomic nervous system	Concentration-effect curve of acetylcholine using the isolated rabbit intestine muscle (kymograph)
<b>8</b>	Autonomic nervous system	Effects and sites of action of different drugs ( stimulants or relaxants ) on the isolated rabbit intestine muscle
<b>9</b>	Autonomic nervous system	Effects and sites of action of different drugs ( stimulants or relaxants ) on the isolated rabbit intestine muscle
<b>10</b>	Autonomic nervous system	Ups and Downs of pharmacology
<b>11</b>	Diuretics	Ups and Downs of pharmacology
<b>12</b>	Antihypertensives	<b>- Practical exam</b>
<b>13</b>	Arrhythmia	

<b>14</b>	Heart failure	
<b>15</b>	Angina	

### **E- Teaching and Learning Methods:**

- Lectures
- Practical sessions
- Self learning (activity, reports, internet search, group discussion...)

### **F- Student Assessment Methods:**

- 1- Written exam to assess a1, a2, a3, a4, c1, c2
- 2- Activity to assess d1
- 3- Practical exam to assess b1, b2, d1
- 4- Oral exam to assess a1, a2, a3, a4, c1, c2

### **Assessment schedule:**

<b>Assessment (1):</b> Practical exam	Week 12
<b>Assessment (2):</b> Activity	Week 9
<b>Assessment (3):</b> Written exams	Week 6, 16
<b>Assessment (4):</b> oral exam	Week 16

### **Weighting of Assessment:**

<b>Assessment method</b>	<b>Marks</b>	<b>Percentage</b>
<b>Written exam</b>	60	60%
<b>Practical exam and activities</b>	25	25%
<b>Oral exam</b>	15	15%
<b>TOTAL</b>	100	100%

### **G- Facilities Required for Teaching and Learning:**

- Black (white) board, Data show, Laboratory equipment (kymograph, organ bath, thermometer), animals and Chemicals.

### **H- List of References:**

- 1- **Course Notes:** Student book of Pharmacology (1) approved by the

Pharmacology and Toxicology department (2017)

- Practical notes of Pharmacology (1) approved by the Pharmacology and Toxicology department (2017)

## **2- Essential (textbooks)**

i- Rang & Dale pharmacology (eighth edition); Churchill Livingstone (2015).

ii- Katzung basic and clinical pharmacology (fourteenth edition); McGraw Hill Lang. (2017).

## **3- Recommended books:**

i- Lippincott illustrated reviews-pharmacology (seventh edition).

ii- Tripathi Essentials of Medical Pharmacology (eighth edition)

## **4- Periodicals and websites:**

- Aquilina A. The extemporaneous compounding of paediatric medicines at Mater Dei Hospital. Journal of the Malta College of Pharmacy Practice. Issue 19, 28 – 30, 2013.

<http://canadianpharmacistsletter.therapeuticresearch.com/ce/ceCourse.asp>

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**Course Coordinator: Prof.Dr. Salah Gharib**

**Head of Department: Prof.Dr. Mona Fouad**

**Date:** / 10 / 29 تم مناقشة و اعتماد توصيف المقرر من مجلس القسم بتاريخ  
2017م

## Matrix I of Pharmacology 1 course

Matrix I of Pharmacology 1 course										
Course content		ILOs of pharmacology 1								
		Knowledge and understanding				Professional and practical skills		Intellectual skills		General and transferable skills
		a1	a2	a3	a4	b1	b2	c1	c2	d1
Lectures										
1	Introduction to pharmacology	x								
2	Pharmacokinetics		x						x	
3	Pharmacodynamics		x						x	
4	Drug- drug interactions		x						x	
5	Adverse drug reactions			x					x	
6	Autonomic nervous system			x	x			x	x	
7	Diuretics				x			x	x	
8	Antihypertensives				x			x	x	
9	Arrhythmia				x			x	x	
10	Heart failure				x			x	x	
11	Angina				x			x	x	
Practical sessions										
1	Drug development Types of pharmacological experiments					x				
2	Concentration-effect curve of acetylcholine using the isolated rabbit intestine muscle (simulation)						x			x
3	Concentration-effect curve of acetylcholine using the isolated rabbit intestine muscle (kymograph)						x			x
4	Effects and sites of action of different drugs ( stimulants or relaxants ) on the isolated rabbit intestine muscle						x			x
5	Ups and Downs of pharmacology						x			x

6	Activity									x
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### Matrix II of pharmacology 1 course

National Academic Reference Standards (NARS)		Program ILOs	Course ILOs	Course contents	Sources	Teaching and learning methods		Method of assessment		
						Lecture	Practical session	Written exam	Practical exam	Oral exam
2.1	Principles of basic, pharmaceutical, medical, social, behavioral, management, health and environmental sciences as well as pharmacy practice.	A4	a1	- Introduction to pharmacology	Student book Essential books	x		x		x
2.8	Principles of pharmacokinetics and biopharmaceutics with applications in therapeutic drug monitoring, dose modification and bioequivalence studies.	A19	a2	- Pharmacokinetics - Pharmacodynamics - Drug- drug interactions - Adverse drug reactions	Student book Essential books	x		x		x
2.11	Principles of body function in health and disease states as well as basis of genomic and different biochemical pathways regarding their correlation with different diseases.	A24	a3	Autonomic nervous system	Student book Essential books	x		x		x
2.13	Pharmacological	A30	a4	Autonomic nervous system	Student book	x		x		x

	properties of drugs including mechanisms of action, therapeutic uses, dosage, contra-indications, ADRs and drug interactions.			Diuretics	Essential books					
				Antihypertensives						
				Arrhythmia						
				Heart failure						
				Angina						
3.2	Handle and dispose chemicals and pharmaceutical preparations safely.	B2	b1	Drug development Types of pharmacological experiments	Practical notes		x		x	
3.8	Apply techniques used in operating pharmaceutical equipment and instruments.	B13	b2	Concentration-effect curve of acetylcholine using the isolated rabbit intestine muscle (simulation) Concentration-effect curve of acetylcholine using the isolated rabbit intestine muscle (kymograph) Effects and sites of action of different drugs ( stimulants or relaxants ) on the isolated rabbit intestine muscle Ups and Downs of pharmacology	Practical notes		x		x	
4.9	Utilize the pharmacological basis of therapeutics in the proper selection and use of	C12	c1	<b>Autonomic nervous system</b>	Student book Essential books Recommended books	x		x		x
				<b>Diuretics</b>						
				<b>Antihypertensives</b>						
				<b>Arrhythmia</b>						
				<b>Heart failure</b>						
				<b>Angina</b>						



4.14	Analyze and evaluate evidence-based information needed in pharmacy practice.	C17	c2	Pharmacokinetics	Student book Essential books Recommended books	x		x		x
				Pharmacodynamics						
				Drug- drug interactions						
				Adverse drug reactions						
5.3	Work effectively in a team.	D4	d1	Concentration-effect curve of acetylcholine using the isolated rabbit intestine muscle (simulation)	Practical notes Recommended books		x		x	
				Concentration-effect curve of acetylcholine using the isolated rabbit intestine muscle (kymograph)						
				Effects and sites of action of different drugs ( stimulants or relaxants ) on the isolated rabbit intestine muscle						
				Ups and Downs of pharmacology						
				Activity						

Course Coordinator: Prof.Dr. Salah Gharib

Head of Department: Prof.Dr. Mona Fouad

Date: 2017 / 10 / 29 تم مناقشة و اعتماد توصيف المقرر من مجلس القسم بتاريخ

# **COURSE SPECIFICATIONS**

**Chromatography of Natural Products**

**Third year – First Term**

**2017-2018**

## Course Specification of Chromatography of Natural Products

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**University:** Zagazig **Faculty:** Pharmacy

### A- Course specifications:

Program(s) on which the course is given: Bachelor of Pharmacy

Major or Minor element of programs: Major

Department offering the program: -----

Department offering the course: Pharmacognosy

Academic year/ Level: Third year /First term

Date of specification approval: October 29, 2017

### B- Basic information:

Title: Chromatography of natural products Code:PG313

Credit Hours: ---

Lectures : 2 hrs/week

Practical: 2 hrs/week

Tutorials: ---

Total: 3 hrs/week

### C- Professional information:

#### 1. Overall Aims of the Course:

On completion of the course, students will be able to illustrate the different techniques for extraction, purification of biologically active constituents of plants or animal origin based on their phytochemical natures.

## 2. Intended Learning Outcomes of chromatography of natural products:

<b>A- Knowledge and Understanding</b>	
<b>a1</b>	Outline the principle of extraction, purification and identification of herbal drugs.
<b>a2</b>	Enumerate the different chromatographic separation techniques.
<b>a3</b>	Illustrate the principles of different chromatographic techniques.
<b>B- Professional and Practical skills</b>	
<b>b1</b>	Handle basic laboratory equipments effectively and safely.
<b>b2</b>	Perform laboratory techniques for extraction, isolation and identification of different classes of natural products.
<b>b3</b>	Construct a research study about different chromatographic techniques.
<b>C- Intellectual skills</b>	
<b>c1</b>	Predict different analytical tools used for determination of naturally occurring constituents qualitatively and quantitative.
<b>c2</b>	Select appropriate chromatographic methods for isolation and identification of secondary metabolites from natural origin.
<b>c3</b>	Analyze and interpret qualitative data in a suitable form.
<b>D- General and Transferable skills</b>	
<b>d1</b>	Work effectively as a member of a team.
<b>d2</b>	Write reports and present it.
<b>d3</b>	Develop communications skills with systematic and creative thinking individually or among a problem solving team.

## D- Course contents:

Week No	Lecture (2 hrs/week)	Practical session (2hrs/week)
1	General procedure for extraction and purification.	Laboratory safety measures Extraction of herbal drugs.
2	-Chromatography. -Introduction, classification, and terminology and mode of chromatographic separation.	Steam distillation of volatile oil containing plants.
3	-Adsorption chromatography. -Column chromatography.	Sublimation and crystallization.
4	-Thin layer chromatography and chromatotron.	Separation of dyes mixtures by column chromatography.
5	-Partition chromatography -Paper chromatography. -DCCC.	Screening of dyes: TLC. <b>Activity</b>
6	Midterm exam	
7	-Non classical column chromatography. -Gas chromatography, principle, mobile phase, stationary phase.	Screening of plant extracts by TLC.
8	-Gas chromatography, detectors, quantification and application.	<b>Practical exam (1)</b>
9	-HPLC, principle, mobile phase, stationary phase.	Screening of dyes by paper chromatography.
10	-HPLC, detectors, quantification and application.	Screening of flavonoids by paper chromatography
11	-Ion exchange chromatography	<b>Activity</b>
12	-Gel chromatography and affinity.	Demonstration of apparatus for chromatography in faculty central lab. <b>Activity</b>
13	-Supercritical fluid chromatography.	<b>Practical exam (2)</b>
14	-Electrophoresis.	
15	-Revision & Open discussion	

### **E- Teaching and Learning Methods:**

- Lectures (data show, board)
- Practical sessions
- Self learning (activities, internet search, group discussion...)

### **F- Student Assessment Methods:**

- 1- Written exam to assess a1, a2, a3
- 2- Activity to assess c2, d1, d2, d3
- 3- Practical exam to assess b1, b2, b3, c1, c2, c3, d3
- 4- Oral exam to assess a1, a2, a3

#### **Assessment schedule:**

<b>Assessment (1):</b> Written exams	Week 6, 16
<b>Assessment (2):</b> Activity	Week 5,11, 12
<b>Assessment (3):</b> Practical exams	Week 8,13
<b>Assessment (4):</b> Oral exams	Week 16

#### **Weighting of Assessment:**

<b>Assessment method</b>	<b>Marks</b>	<b>Percentage</b>
<b>Written exam</b>	60	60%
<b>Practical exam and activities</b>	25	25%
<b>Oral exam</b>	15	15%
<b>TOTAL</b>	100	100%

### **G- Facilities Required for Teaching and Learning:**

Black (white) board, Data show, Laboratory equipment and Chemicals.

### **H- List of References:**

**1- Student's book** approved by Pharmacognosy Department on 2017.

#### **2- Essential Books:**

- i- Comprehensive Natural Products Chemistry; Barton, D and Nakanishi, K, Elsevier Science Ltd.(1999)
- ii- Natural Products Chemistry;Torssel, K. B. G.: Apotekars. Press (1997)
- iii- Natural Products from Plants; Kaufmann, P. B et al ;CRC Press (1999).

iv- Pharmacognosy and Pharmacobiotechnology; Robbers, J. E., Speedie, M. K. and Tyler, V. E.; Williams & Wilkins (1996).

vi- Preparative Chromatography Techniques; Application in Natural Products Isolation; Hostettmann, K. Marston, A, and Hostettmann, M. 2<sup>nd</sup> Ed. Springer (1998)

### 3- Recommended Books

i- The Hand Books of Natural Flavonoids; Harborne, J., B. and Baxter, H.; John Wiley & Sons Ltd. (1999).

ii- Natural Products Isolation; Canell, R. J. P, Humana Press. (1998).

iii- Chromatographic Analysis of pharmaceuticals; Adamovics, J. A; 2<sup>nd</sup> Ed (1997).

iv- Phytochemical Resources for Medicine and Agriculture; Nigg, H. N. and Seigler, D.; Plenum Press (1992).

v- Medicinal Natural Products; A Biosynthetic Approach. Dewick, P. M.; John Wiley & Sons (1998).

### 4- Periodicals and websites:

Plant Biotechnology, J. Molecular Biology, Plant Molecular Biology, Plant Cell Physiology, Die Pharmazie; Planta medica, Phytochemistry, J. of Natural Products and Fitoterapia .

[http:// www.elsevier.com/phytochem](http://www.elsevier.com/phytochem)

[http:// www.elsevier.com/phytomed](http://www.elsevier.com/phytomed)

[http:// www.wiley.co.uk](http://www.wiley.co.uk).

[http:// bioweb@cellbiol.com](http://bioweb@cellbiol.com)

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**Course Coordinator:** Prof. Dr. Fawqia Abbas

**Head of Department:** Prof. Dr. Azza El-Shafae

**Date:** تم مناقشة واعتماد توصيف المقرر من مجلس القسم بتاريخ 29 / 10 / 2017 م

## Matrix I of Chromatography of natural products Course

Course Contents		ILOs of Chromatography of natural products Course											
		Knowledge and understanding			Professional and practical skills			Intellectual skills			Transferable and general skills		
		a1	a2	a3	b1	b2	b3	c1	c2	c3	d1	d2	d3
<b>Lectures</b>													
<b>1</b>	- General procedure for extraction and purification.	×											
<b>2</b>	- Chromatography.		×										
<b>3</b>	- Introduction, classification, and terminology and mode of chromatographic separation.		×										
<b>4</b>	- Adsorption chromatography.			×									
<b>5</b>	- Column chromatography.			×									
<b>6</b>	- Thin layer chromatography and chromatotron.			×									
<b>7</b>	- Partation chromatography			×									
<b>8</b>	- Paper chromatography.			×									



9	- DCCC.			×									
10	- Non classical column chromatography.			×									
11	- Gas chromatography, principle, mobile phase, stationary phase.			×									
12	- Gas chromatography, detectors, quantification and application.			×									
13	- HPLC, principle, mobile phase, stationary phase.			×									
14	- HPLC, detectors, quantification and application.			×									
15	- Ion exchange chromatography			×									
16	- Gel chromatography and affinity.			×									
17	- Supercritical fluid chromatography.			×									
18	- Electrophoresis.			×									
<b>Practical sessions</b>													
19	- Laboratory safety measures				×								
20	- Extraction of herbal drugs.					×	×						
21	- Steam distillation of volatile oil containing plants.					×	×						

22	- Sublimation and crystallization.					×	×						
23	- Separation of dyes mixtures by column chromatography.					×	×			×			
24	- Screening of dyesTLC.					×	×	×		×			
25	- Screening of plant extracts by TLC .					×	×	×		×			
26	- Screening of dyes by paper chromatography.					×	×			×			
27	- Screening of flavonoids by paper chromatography					×	×			×			
28	- Demenstration of apparatus for chromatography in faculty cental lab.					×	×			×			
29	- Activity								×		×	×	×

## Matrix II of Chromatography of natural products Course

National Academic Reference Standards (NARS)		Program ILOs	Course ILOs	Course contents	Sources	Teaching and learning methods			Weighting of assessment		
						Lecture	Practical session	Self learning	Written exam	Practical exam	Oral exam
Lectures											
2.1	Principles of basic, pharmaceutical, medical, social, behavioral, management, health and environmental sciences as well as pharmacy practice.	A2	a1	- General procedure for extraction and purification.	Student's book	x			x		x
			a2	- Chromatography	Student's book	x			x		x
				- Introduction, classification, and terminology and mode of chromatographic separation.	Student's book	x			x		x
2.3	Principles of different analytical techniques using GLP guidelines and	A11	a3	- Adsorption chromatography.	Student's book	x			x		x
				- Column chromatography.	Student's book	x			x		x

	validation procedures.			- Thin layer chromatography and chromatotron.	Student's book	x			x		x
				- Partation chromatography	Student's book	x			x		x
				- Paper chromatography.	Student's book	x			x		x
				- DCCC.	Student's book	x			x		x
				- Non classical column chromatography.	Student's book	x			x		x
				- Gas chromatography, principle, mobile phase, stationary phase.	Student's book	x			x		x
				- Gas chromatography, detectors, quantification and application.	Student's book	x			x		x
				- HPLC, principle, mobile phase, stationary phase.	Student's book	x			x		x

				- HPLC, detectors, quantification and application.	Student's book	x			x		x
				- Ion exchange chromatography	Student's book	x			x		x
				- Gel chromatography and affinity.	Student's book	x			x		x
				- Supercritical fluid chromatography.	Student's book	x			x		x
				- Electrophoresis.	Student's book	x			x		x
Practical sessions											
3.2	Handle and dispose chemicals and pharmaceutical preparations safely	B2	b1	- Laboratory safety measures	Practical notes		x			x	
3.4	Extract, isolate, synthesize, purify, identify, and/or standardize active substances from different origins.	B5	b2	- Extraction of herbal drugs.	Practical notes		x			x	
				- Steam distillation of volatile oil containing plants.	Practical notes		x			x	
				- Sublimation and crystallization.	Practical notes		x			x	

				- Separation of dyes mixtures by column chromatography.	Practical notes		x			x	
				- Screening of dyesTLC.	Practical notes		x			x	
				- Screening of plant extracts by TLC .	Practical notes		x			x	
				- Screening of dyes by paper chromatography.	Practical notes		x			x	
				- Screening of flavonoids by paper chromatography	Practical notes		x			x	
				- Demenstration of apparatus for chromatography in faculty cental lab.	Practical notes		x			x	
3.11	Conduct research studies and analyze the results	B16	b3	- Activity	Internet, essential and recommended books.			x		x	

**Course Coordinator:** Prof. Dr. Fawqia Abbas

**Head of Department:** Prof. Dr. Azza El-Shafae

**Date:** 2017/ 10 / 29 م تم مناقشة و اعتماد توصيف المقرر من مجلس القسم بتاريخ

# **COURSE SPECIFICATIONS**

## **Medicinal Chemistry (1)**

**Third Year-First Term**

**2017-2018**

## Course Specification of Medicinal Chemistry (1)

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**University:** Zagazig **Faculty:** Pharmacy

### A- Course specifications:

Program(s) on which the course is given: Bachelor of Pharmacy

Major or Minor element of programs: Major

Department offering the program: -----

Department offering the course: Medicinal chemistry Department

Academic year/Level: Third year /First term

Date of specification approval: 22/8/2017

### B- Basic information:

Title: Medicinal Chemistry (1) Code: MC310

Credit Hours: ---

Lectures: 2 hrs/week

Practical: 2 hrs/week

Tutorials: ---

Total: 3 hrs/week

### C- Professional information:

#### 1-Overall Aims of the Course:

On completion of the course, students will be able to demonstrate physicochemical properties of drugs in relation to biological action, total synthesis, mechanism of action, and adverse reactions. In addition, students will be able to explain the basics of medicinal chemistry through identification of the chemistry and uses of different drug classes (Antibiotics, antiseptics, disinfectants,



antiprotozoals, antimalarials, anthelminitics, antifungals& sulfonamides).

## 2-Intended Learning Outcomes of Medicinal Chemistry (1) (ILOs):

<b>A- Knowledge and Understanding</b>	
<b>a1</b>	Describe the chemistry of different drug classes (Antibiotics, antiseptics, disinfectants, antiprotozoals, antimalarials, anthelminitics, antifungals&sulfonamides).
<b>a2</b>	Outline the synthetic pathways of some of the aforementioned drugs.
<b>a3</b>	Recognize mode of action & SAR of the aforementioned drugs.
<b>B- Professional and Practical skills</b>	
<b>b1</b>	Handle basic laboratory equipments, chemicals effectively and safely.
<b>b2</b>	Identify the impurities of active substances in samples.
<b>b3</b>	Establish a research study for assay and analysis of impurities according to pharmacopeial standards.
<b>C- Intellectual skills</b>	
<b>c1</b>	Apply GLP guide lines in pharmacy practice through learning different analytical techniques.
<b>c2</b>	Evaluate quantitative and qualitative methodology of authentic samples.
<b>c3</b>	Evaluate quantitative and qualitative methodology of pharmaceutical preparations.
<b>D- General and Transferable skills</b>	
<b>d1</b>	Work effectively as a member of a team with other students.
<b>d2</b>	Write reports and present it.

<b>Week No.</b>	<b>Lecture (2hrs/week)</b>	<b>Practical session (2hrs/week)</b>
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**D- Contents:**

<b>1</b>	Introduction to medicinal chemistry (physicochemical properties in relation to biological action).	-Laboratory safety measures
<b>2</b>	Antiprotozoal agents (antiamoebic, antitrichomonal, anti giardial agents, antileishmanial & antitrypanosomal agents).	- <u>Tests for Purity</u> Limit test for chloride (E.p. & B.p.)
<b>3</b>	Antimalarials (4-amino quinolines, 8-aminoquinolines, acridine derivatives, biguanides & pyrimidine derivatives).	Limit test for sulphate (E.P)
<b>4</b>	Anthelminitics ( drugs active for nematodes & cestodes).	Limit test for sulphate (B.P)
<b>5</b>	Anthelminitics (drugs active for trematodes & antibelharzials).	Limit test for iron (E.P.) <b>-Activity( case study)</b>
<b>6</b>	Midterm exam	
<b>7</b>	Sulphonamides.	Limit test for lead (E.P)
<b>8</b>	Antifungals.	Limit test for lead (B.P)
<b>9</b>	Antibiotics (B-lactam penicillin antibiotics)	Test for heavy metals (E.p.). <b>Activity 2 ( case study)</b>
<b>10</b>	Antibiotics (B-lactam antibiotics, cephalosporins & aminoglycosides)	Revision scheme 1
<b>11</b>	Antibiotics (macrolide, fused ring, conjugated polyene compounds & poly peptide antibiotics ).	Revision scheme 2
<b>12</b>	Antibiotics (sulphur containing antibiotics & unclassified antibiotics)	<b>Practical exam</b>
<b>13</b>	Antiseptics& disinfectants (alcohol, aldehyde, acids, oxidizing agents, chlorine containing compounds, phenolic compounds, cationic surfactants).	<b>Practical exam</b>
<b>14</b>	Antiseptics& disinfectants (dyes, nitrofurans derivatives, mercury containing compounds & floroquinolones)	
<b>15</b>	Revision & open discussion	

## E- Teaching and Learning Methods:

- Lectures & Explanatory videos
- Practical sessions
- Self learning (activity, case report)

## F- Student Assessment Methods:

- 1- Written exam to assess a1, a2, a3, c3
- 2- Activity to assess d1, d2
- 3- Practical exam to assess b1, b2, b3, c1, d1, d2
- 4- Oral exam to assess a1, a2, a3, c3

### Assessment schedule:

<b>Assessment (1):</b> Written exams	Week 6,16
<b>Assessment (2):</b> Activity	Week 5,9
<b>Assessment (3):</b> Practical exams	Week 12, 13
<b>Assessment (4):</b> Oral exams	Week 16

### Weighting of Assessment:

Assessment method	Marks	Percentage
Written exam	60	60%
Practical exam and activities	25	25%
Oral exam	15	15%
<b>TOTAL</b>	100	100%

## G- Facilities Required for Teaching and Learning:

- Black (white) board, Data show, Laboratory equipment (Nessler tubes) and Chemicals.

## H- List of References:

- 1- Course Notes:** Student book of Medicinal chemistry (1) approved by medicinal chemistry department 2017
- Practical notes of Medicinal chemistry (1) approved by medicinal chemistry department 2017

## 2- Essential Books:

- Wilson & Griswold's Textbook of Organic: Medicinal and Pharmaceutical Chemistry; Wilson, Charles Owens; Beale, John Marlowe; Block, John H.; Block, John H.; Griswold, Ole; Wiley-Interscience (2012).
- Foye's Principles of Medicinal Chemistry; Williams, David A., William O. Foye, and Thomas L. Lemke; Lippincott Williams and Wilkins (2012).
- B.p. & U.S Pharmacopia (1988-2013)

## 3- Recommended books

- i- An Introduction to Medicinal Chemistry; Patrick, Graham L, Oxford (2013)

## 4- Periodicals, Web Sites, etc

<http://www.ncbi.nlm.nih.gov/sites/entrez>

<http://journals.tubitak.gov.tr/chem/index.php>

<http://www.pharmacopoeia.co.uk/>

[www.Pubmed.Com](http://www.Pubmed.Com)

[www.sciencedirect.com](http://www.sciencedirect.com)

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**Course Coordinator: Prof. Dr./ Sobhy M. El-Adl.**

**Head of Department: Prof. Dr./ Mohammed Baraka.**

**Date: 22/8/2017** تم مناقشة و اعتماد توصيف المقرر من مجلس القسم بتاريخ

Matrix I of Medicinal chemistry 1 course												
Course Contents		ILOs of Medicinal chemistry 1course										
		Knowledge and understanding			Professional and practical skills			Intellectual skills			General and transferable skills	
Lectures		a1	a2	a3	b1	b2	b3	c1	c2	c3	d1	d2
1	Introduction to medicinal chemistry (physicochemical properties in relation to biological action)	x	x	x								
2	Antiprotozoal agents (antiamoebic, antitrichomonal, antigiardial agents, antileishmanial & antitrypanosomal agents).	x	x	x								
3	Antimalarials (4-amino quinolines, 8-aminoquinolines, acridine derivatives, biguanides & pyrimidine derivatives)	x	x	x								
4	Anthelminitics ( drugs active for nematodes & cestodes)	x	x	x								
5	Anthelminitics (drugs active for trematodes & antibelharzials)	x	x	x								
6	Sulphonamides	x	x	x								
7	Antifungals	x	x	x								
8	Antibiotics (B-lactam penicillin antibiotics)	x	x	x						x		
9	Antibiotics (B-lactam antibiotics, cephalosporins & aminoglycosides)	x	x	x						x		
10	Antibiotics (macrolide, fused ring, conjugated polyene compounds & poly peptide antibiotics ).	x	x	x						x		
11	Antibiotics (sulphur containing antibiotics & unclassified antibiotics)	x	x	x						x		
12	Antiseptics& disinfectants (alcohol, aldehyde, acids, oxidizing agents, chlorine containing compounds, phenolic compounds, cationic surfactants)	x	x	x								
13	Antiseptics& disinfectants (dyes, nitrofurans derivatives, mercury	x	x	x								

	containing compounds & floroquinolones)											
<b>Practical sessions</b>												
<b>1</b>	Laboratory safety measures				x							
<b>2</b>	Limit tests for chlorides , sulphates , iron , lead				x	x	x	x	x	x	x	x
<b>3</b>	Test for heavy metals				x	x	x	x	x			x
<b>4</b>	Activity (case study)										x	x

## Matrix II of Medicinal chemistry 1 course

National Academic Reference Standards (NARS)		Program ILOs	Course ILOs	Course contents	Sources	Teaching and learning methods			Methods of assessment		
						Lecture	Practical session	Self learning	Written exam	Practical exam	Oral exam
2.1	Principles of basic, pharmaceutical, medical, social, behavioral, management, health and environmental sciences as well as pharmacy practice.	A2	a1	Antibiotics ( B-lactam antibiotics penicillins )	Student book	x			x		x
				Antibiotics ( B-lactam antibiotics cephalosporins ) & aminoglycosides	Student book	x			x		x
				Antibiotics ( macrolide , fused ring , conjugated polyene compounds , poly peptide antibiotics )	Student book	x			x		x
				Antibiotics ( sulphur containing antibiotics , unclassified antibiotics ). Antiseptics&disinfectants ( alcohol,aldehyde,acids)	Student book Essential books Internet	x		x	x		x
				Antiseptics & disinfectants ( chlorine containing compounds, phenolic compounds, cationic surfactants, dyes, nitrofurans derivatives)	Student book	x			x		x
				Antiseptics & disinfectants (floroquinolones)	Student book	x			x		x



				Antiprotozoal agents ( antiamoebic , antitrichomonal , anti giardial agents , antileishmanial , antitrypanosomal agents)	Student book	x			x		x
				Antimalarials (4-amino quinolines 8-aminoquinolines )	Student book	x			x		x
				Antimalarials ( acridine derivatives , Biguanides , pyrimidine derivatives )	Student book	x			x		x
				Anthelminitics ( drugs active for nematodes & cestodes)	Student book	x			x		x
				Anthelminitics ( drugs active for trematodes antihelminthiasis ) & Antifungals	Student book, essential books	x		x	x		x
				Antifungals & sulfonamides classification	Student book	x			x		x
				sulfonamides	Student book	x			x		x
2.5	Principles of drug design, development and synthesis.	A15	a2	Antibiotics ( B-lactam antibiotics penicillins )	Student book	x			x		x
				Antibiotics ( B-lactam antibiotics cephalosporins ) & aminoglycosides	Student book	x			x		x
				Antibiotics ( macrolide , fused ring , conjugated polyene compounds , poly peptide antibiotics )	Student book Essential books Internet	x		x	x		x

2.13	Pharmacological properties of drugs	A30	a3	Antibiotics ( sulphur containing antibiotics , unclassified antibiotics ). Antiseptics&disinfectants ( alcohol,aldehyde,acids)	Student book	x				x		x
				Antiseptics & disinfectants ( chlorine containing compounds, phenolic compounds, cationic surfactants, dyes, nitrofurans derivatives)	Student book	x				x		x
				Antiseptics & disinfectants (floroquinolones)	Student book	x				x		x
				Antiprotozoal agents ( antiamoebic , antitrichomonal , anti giardial agents , antileishmanial ,antitrypanosomal agents)	Student book	x				x		x
				Antimalarials (4-amino quinolines 8-aminoquinolines )	Student book	x				x		x
				Antimalarials ( acridine derivatives , Biguanides , pyrimidine derivatives )	Student book	x				x		x
				Anthelminitics ( drugs active for nematodes &cestodes)	Student book	x		x		x		x
				Anthelminitics ( drugs active for trematodes antibelharzial) &. Antifungals	Student book	x				x		x
				Antifugals & sulfonamides classification	Student book	x				x		x
				sulphonamides	Student book	x				x		x
				Antibiotics ( B-lactam antibiotics penicillins )	Student book	x				x		x

	including mechanisms of action, therapeutic uses, dosage, contra-indications, ADRs and drug interactions.		Antibiotics ( B-lactam antibiotics cephalosporins ) & aminoglycosides	Student book	x			x		x
			Antibiotics ( macrolide , fused ring , conjugated polyene compounds , poly peptide antibiotics )	Student book	x			x		x
			Antibiotics ( sulphur containing antibiotics , unclassified antibiotics ). Antiseptics&disinfectants ( alcohol,aldehyde,acids)	Student book, Internet	x		x	x		x
			Antiseptics & disinfectants ( chlorine containing compounds, phenolic compounds, cationic surfactants, dyes, nitrofurans derivatives)	Student book	x			x		x
			Antiseptics & disinfectants (floroquinolones)	Student book	x			x		x
			Antiprotozoal agents ( antiamoebic , antitrichomonal , anti giardial agents , antileishmanial ,antitrypanosomal agents)	Student book	x			x		x
			Antimalarials (4-amino quinolines 8-aminoquinolines )	Student book	x			x		x
			Antimalarials ( acridine derivatives , Biguanides , pyrimidine derivatives )	Student book	x			x		x
			Anthelminitics ( drugs active for nematodes &cestodes)	Student book	x			x		x
			Anthelminitics ( drugs active for trematodes antibelharzial ) &. Antifungals	student book Internet	x		x	x		x

				Antifugals & sulfonamides	Student book	x			x		x
				sulphonamides	Student book	x			x		x
3.2	Handle and dispose chemicals and pharmaceutical preparations safely	B2	b1	Laboratory safety measures	Practical notes		x			x	
3.4	Extract, isolate, synthesize, purify, identify, and/or standardize active substances from different origins.	B6	b2	Limit tests for chlorides , sulphates , iron , lead	Practical notes		x			x	
				Test for heavy metals	Practical notes		x			x	
3.11	Conduct research studies and analyze the results.	B17	b3	Limit tests for chlorides , sulphates , iron , lead	Practical notes		x	x		x	
				Test for heavy metals	Practical notes		x	x		x	
4.1	Apply pharmaceutical knowledge in the formulation of	C1	c1	Limit tests for chlorides , sulphates , iron , lead	Practical notes		x			x	

	safe and effective medicines as well as in dealing with new drug delivery systems.			Test for heavy metals	Practical notes		x			x	
4.3	Apply qualitative and quantitative analytical and biological methods for QC and assay of raw materials as well as pharmaceutical preparations	C4	c2	Limit tests for chlorides , sulphates , iron , lead	Practical notes		x			x	
				Test for heavy metals	Practical notes		x			x	
4.3	Apply qualitative and quantitative analytical and biological methods for QC and assay of raw materials as well as pharmaceutical preparations	C5	c3	Antiseptics & disinfectants ( chlorine containing compounds, phenolic compounds, cationic surfactants, dyes, nitrofurans derivatives) Antiseptics & disinfectants (floroquinolones) Antifugals & sulfonamides Limit tests for chlorides , sulphates , iron , lead in Pharmaceutical product	Student book Practical notes	x	x		x	x	x

5.3	Work effectively in a team	D4	d1	Limit tests for chlorides , sulphates , iron , lead	Practical notes		x			x	
				Activity	Internet Recommended books		x	x		x	
5.9	Implement writing and presentation skills	D11	d2	Limit tests for chlorides , sulphates , iron , lead	practical notes		x			x	
				Test for heavy metals	Practical notes		x			x	
				Activity	Internet Recommended books		x	x		x	

**Course Coordinator: Prof. Dr./ Sobhy M. El-Adl.**

**Head of Department: Prof. Dr./ Mohammed Baraka.**

**Date: 22/8/2017** تم مناقشة و اعتماد توصيف المقرر من مجلس القسم بتاريخ

