

COURSE SPECIFICATIONS

Faculty of Pharmacy

**Bachelor of pharmacy
(Clinical Pharmacy)
Fourth level – Semester 7**

2018-2019

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**COURSE
SPECIFICATIONS**

Medicinal chemistry -1

Fourth level –Semester 7

2018-2019

Course specification of Medicinal Chemistry-1

University: Zagazig

Faculty: Pharmacy

A- Course identification:

1. Program (s) on which the course is given: Bachelor of pharmacy
(Clinical pharmacy)
2. Major or Minor element of programs: Major
3. Department offering the course: Medicinal chemistry Dept.
4. Academic year Level: forth level/ seventh semester
5. Date of specification approval: 24/9/2018

B- Basic information:

Title : Medicinal chemistry I Code: PC709

Credit Hours: 2h + 1h = 3h

Lectures: 2 hrs/week

Practical: 1 hrs/week

Tutorials: ----

C- Professional information:

1- Objectives:

On completion of the course, the student will be able to:

- Illustrate physicochemical properties of drugs in relation to biological action total synthesis, mechanism of action, and adverse reactions
- Determine pharmaceutical products like Antibiotics, Antiseptics, Sulfonamides, Antimalaria and Anticancer drugs.

2- Intended Learning Outcomes (ILOs):

A- Knowledge and Understanding:	
a1	Define and illustrate the basic terms and concepts of medicinal chemistry
a2	Enumerate and list the drug members of a given chemotherapeutic class (Antibiotics, Antiseptics, Antimalaria and Sulfonamides).
a3	State the synthetic starting compounds for the aforementioned chemotherapeutic agents.
a 4	Describe the analytical methods for determination of the chemotherapeutic agents.
B- Professional and Practical skills:	
b1	Handle basic laboratory equipments and chemicals effectively and safely.
b2	Assess the purity of medicinal agents in the different dosage forms.
b3	Conduct laboratory determination of the potency of drugs.
C- Intellectual skills:	
c1	Assess the marketed chemotherapeutic agents for the common diseases.
c2	Develop new sensitive analytical methods and chemical reagents for the determination of the market chemotherapeutic products.
c3	Explain new routes for the total synthesis of the market drugs.
c4	Modify the SAR of the known chemotherapeutic agents.
D-General and Transferable skills:	
d1	Present various information and arguments clearly and correctly either by writing or orally.
d2	Work effectively as part of a team.
d3	Manage time to meet targets within deadlines.
d 4	Develop critical thinking and find an effective solution for a given problem.

D- Contents:

Week No.	Lecture contents	Practical session
1	-Introduction. -Physicochemical properties in relation to biological action part 1	-Laboratory safety measures
2	-Physicochemical properties in relation to biological action part 2	-Limit test for chloride
3	-Antiseptics & disinfectants (alcohol, aldehyde, acids)	-Limit test for sulphate (E.P)
4	-Antiseptics & disinfectants (chlorine containing compounds, phenolic compounds, cationic surfactants, dyes, nitrofurans derivatives, organomercuric compounds & fluoroquinolones)	-Limit test for sulphate (B.P)
5	-Cancer chemotherapy	-Limit test for iron -Activity (Presentation)
6	-Cancer chemotherapy	--Limit test for lead (E.P)
7	Midterm exam	-Practical exam1
8	-Cancer chemotherapy	-Test for heavy metals
9	-Sulphonamides	-Identification of sulpha drugs Quantitative estimation of boric acid
10	-Sulphonamides	-Identification of organic acids and its salts of pharmaceutical use
11	-Antimalaria	-Quantitative estimation of hexamine -Activity (Internet search)
12	-Antibiotics (B-lactam antibiotics penicillinscephalosporins) & aminoglycosides	-Identification of iron , zinc and magnesium salts of pharmaceutical use
13	-Antibiotics (macrolide , fused ring , conjugated polyene compounds , poly peptide antibiotics)	-Identification of boric acid , borax, urea and hexamine -Quantitative estimation of hydrogen peroxide
14	-Antibiotics (sulphur containing	- practical exam 2

	antibiotics , unclassified antibiotics)	
15	Final written exam	

E- Teaching and Learning Methods:

- Lectures
- Practical sessions
- Activity (presentation-Internet search)

F- Student Assessment methods:

1- Written exams to assess: a1, a2, a3, a4, c1, c2, c3, c4

2- Activity to assess: d1, d4

3- Practical exams to assess: b1, b2, b3, d2, d3

4- Oral exam to assess: a1, a2, a3, a4, c1, c2, c3, c4 d1, d4

Assessment schedule

Assessment (1): Midterm exam	7
Assessment (2): Final written exam	Week 15
Assessment (3): Activity	Week 5, 11
Assessment (4): Practical exams	Week 7,14
Assessment (5): Oral exams	Week 15

Weighting of Assessment

Assessment method	Marks	Percentage
Midterm exam	10	10%
Final written exam	50	50%
Practical practice & activity	25	25%
Oral exam	15	15%
TOTAL	100	100%

G- Facilities required for teaching and learning:

- For lectures: Black (white) boards, data show, air conditioned classroom
- For practical: Chemicals, glassware, instruments, Software, Digital balances.

H- List of References:

1- Course Notes: Student book of Medicinal chemistry (1) approved by Medicinal chemistry department 2018

2- Essential Books (Text Books)

- i-Textbook of Organic Medicinal and Pharmaceutical Chemistry
"Wilson, Charles Owens; Beale, John Marlowe; Block, John H.; Block, John H.; Gisvold, Ole "Wilson & Gisvold's 12th ed., Wiley-Interscience (2006).
- ii- "Foye's Principles of Medicinal Chemistry", Williams, David A., William O. Foye, and Thomas L. Lemke 7th ed., Lippincott Williams and Wilkins (2013).
- iii- An Introduction to Medicinal Chemistry", Patrick, Graham L "An Introduction to Medicinal Chemistry" 3rd ed., Oxford University Press (2005).

3- Periodicals, Web Sites, etc

- i- Anti-Cancer Drug Design
- ii- Bioorganic & Medicinal Chemistry Letters
- iii- Medicinal Research Reviews
- iv- Drugs of the Future.

Course Coordinator: Prof. Dr. Sobhy EL-Adl

Head of Department: Prof. Dr. Kamel Metwally

_Date **24/9/2018** تم مناقشة واعتماد توصيف المقرر من مجلس القسم المقرر بتاريخ

Matrix -1 of Medicinal chemistry-1																
Course Contents		ILOs of Medicinal chemistry 1 course														
		knowledge and understanding				professional and practical skills			intellectual skills				Transferable and general skills			
		a1	a2	a3	a4	b1	b2	b3	c1	c2	c3	c4	d1	d2	d3	d4
1	-Introduction. -Physicochemical properties in relation to biological action part 1	X														
2	Physicochemical properties in relation to biological action part 2	X														
3	-Antiseptics&disinfectants (alcohol,aldehyde,acids)	X											x			x
4	-Antiseptics&disinfectants (chlorine containing compounds, phenolic compounds, cationic surfactants, dyes, nitrofurans derivatives, organomercuric compounds & floroquinolones)		x	x	X						x	x	x			x
5	Anticancer		x	x	X				x	x		x	x			x
6	Anticancer		x	x	X							x	x			x
7	Anticancer		x	x	X								x			x
8	Sulphonamides		x	x	X								x			x
9	Sulphonamides		x	x	X								x			x
10	-Antimalaria		x	x	X								X			x

11	-Antibiotics (sulphur containing antibiotics, unclassified antibiotics)		x	x	X								X			X
12	-Antibiotics (macrolide , fused ring , conjugated polyene compounds , poly peptide antibiotics)		x	x	X						x	X				X
13	-Antibiotics (sulphur containing antibiotics, unclassified antibiotics)		x	x	X							X				X
14	Laboratory safety measures					X										
15	limit test for sulphates, chlorides, iron, lead& test for heavy metals						x	x						x		
16	Quantitative estimation of boric acid, hexamine, hydrogen peroxide						x	x								X
17	Identification of organic acids / salts,iron , zinc and magnesium salts, sulpha, boric acid, urea and hexamine of pharmaceutical use						x	x								

Matrix- 2 of Medicinal Chemistry -1

Matrix- 2 of Medicinal Chemistry -1												
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	Midterm exam
2.1	Principles of basic, pharmaceutical, medical, social, behavioral, management, health and environmental sciences as well as pharmacy practice.	A2	a1	Introduction Physicochemical properties in relation to biological action part 1	Student book, essential books	X			x		x	x
				Physicochemical properties in relation to biological action part 2	Student book, essential books	X			x		x	x
2.3	Principles of different analytical techniques using GLP guidelines and validation procedure	A7	a2 a4	Antibiotics (B-lactam antibiotics penicillinscephalosporins) & aminoglycosides	Student book, essential books	X			x		x	
				Antibiotics (macrolide , fused ring , conjugated polyene compounds , poly peptide antibiotics)	Student book, essential books	X			x		x	

2.4	Principles of isolation, synthesis, purification, identification, and standardization methods of pharmaceutical compounds.	A8	a3	Antibiotics (sulphur containing antibiotics , unclassified antibiotics)	Student book, essential books	X		x	x		x	
				Antiseptics & disinfectants (alcohol,aldehyde,acids)	Student book, essential books	X			x		x	x
				Antiseptics&disinfectants (chlorine containing compounds, phenolic compounds, cationic surfactants, dyes, nitrofurans derivatives & floroquinolones)	Student book, essential books	X			x		x	x
				Sulphonamides	Student book, essential books	X			x		x	
				Antimalaria	Student book, essential books	X			x		x	
				Anticancer	Student book, essential books	X		x	x		x	x
2.1 7	Methods of biostatistical analysi and pharmaceutical calculation	A27	a4	Antibiotics (B-lactam antibiotics penicillinscephalosporins) & aminoglycosides	Student book, essential books	X			x		x	x
				Antibiotics (macrolide , fused ring , conjugated polyene compounds , poly peptide antibiotics)	Student book, essential	X			x		x	x

				books								
			Antibiotics (sulphur containing antibiotics , unclassified antibiotics)	Student book, essential books	X			x		x		x
			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 & floroquinolones)	Student book, essential books	X			x		x		
			Sulphonamides	Student book, essential books	X			x		x		
			Antimalaria	Student book, essential books	X			x		x		
			Anticancer	Student book, essential books	X			x		x		

3.2	Handle and dispose chemicals and pharmaceutical preparations safely	B2	b1	Laboratory safety measures	practical notebook		X			x		
3.4	Extract, isolate, synthesize, purify, identify, and /or standardize active substances from different origins.	B5	b2	limit test for sulphates, chlorides, iron, lead & test for heavy metals	practical notebook		X			x		
				Quantitative estimation of boric acid, hexamine, hydrogen peroxide								
			b3	limit test for sulphates, chlorides, iron, lead & test for heavy metals	practical notebook		X			x		
				Quantitative estimation of boric acid, hexamine, hydrogen peroxide	practical notebook		X			x		

4.3	Apply qualitative and quantitative analytical and biological methods for QC and assay of raw materials as well as pharmaceutical preparations.	C3	c1	Antibiotics (B-lactam antibiotics penicillins, cephalosporins) & aminoglycosides, macrolide , fused ring , conjugated polyene compounds , poly peptide antibiotics, sulphur containing antibiotics , unclassified antibiotics)	Student book, essential books	X						X	
				Antiseptics & disinfectants(alcohol,aldehyde,acids, chlorine containing compounds, phenolic compounds, cationic surfactants, dyes, nitrofurans derivatives & floroquinolones)									
4.5	Select the appropriate methods of isolation, synthesis, purification, identification and standardization of active substances from different origins.	C5	c2	Sulphonamides	Student book, essential books	X						X	
				Antimalaria									
				Anticancer									
				Antibiotics (B-lactam antibiotics penicillins, cephalosporins) & aminoglycosides, macrolide , fused ring , conjugated polyene compounds , poly peptide antibiotics, sulphur containing antibiotics , unclassified antibiotics)									
				Antiseptics & disinfectants(alcohol,aldehyde,acids, chlorine containing compounds, phenolic compounds, cationic surfactants, dyes, nitrofurans derivatives & floroquinolones)									
				Sulphonamides									

				Antimalaria Anticancer								
4.5	Select the appropriate methods of isolation, synthesis, purification, identification and standardization of active substances from different origins.	C6	c3	Antibiotics (B-lactam antibiotics penicillins, cephalosporins) & aminoglycosides, macrolide , fused ring , conjugated polyene compounds , poly peptide antibiotics, sulphur containing antibiotics , unclassified antibiotics) Antiseptics & disinfectants(alcohol,aldehyde,acids, chlorine containing compounds, phenolic compounds, cationic surfactants, dyes, nitrofurans derivatives & floroquinolones) Sulphonamides Antimalaria Anticancer	Student book, essential books	X						X
4.5	Select the appropriate methods of isolation, synthesis, purification, identification and standardization	C6	c4	Antibiotics (B-lactam antibiotics penicillins, cephalosporins) & aminoglycosides, macrolide , fused ring , conjugated polyene compounds , poly peptide antibiotics, sulphur containing antibiotics , unclassified antibiotics) Antiseptics & disinfectants(alcohol,aldehyde,acids, chlorine	Student book, essential books	X						X

	of active substances from different origins.			containing compounds, phenolic compounds, cationic surfactants, dyes, nitrofurans derivatives & floroquinolones) Sulphonamides Antimalaria Anticancer								
5.9	Implement writing and presentation skills	D11	d1	Antibiotics (B-lactam antibiotics penicillins, cephalosporins) & aminoglycosides, macrolide , fused ring , conjugated polyene compounds , poly peptide antibiotics, sulphur containing antibiotics , unclassified antibiotics) Antiseptics & disinfectants(alcohol,aldehyde,acids, chlorine containing compounds, phenolic compounds, cationic surfactants, dyes, nitrofurans derivatives & floroquinolones) Sulphonamides Antimalaria Anticancer	Internet search		X					
5.3	Work effectively in a team	D4	d2	limit test for sulphates,chlorides,iron,lead&test for heavy metals	practical notebook		X			x		

5.8	Demonstrate creativity and time management skills	D10	d3	Quantitative estimation of boric acid, hexamine, hydrogen peroxide	practical notebook		X				x		
5.10	Implement writing and thinking, problem-solving and decision-making abilities	D12	d4	Antibiotics (B-lactam antibiotics penicillins, cephalosporins) & aminoglycosides, macrolide , fused ring , conjugated polyene compounds , poly peptide antibiotics, sulphur containing antibiotics , unclassified antibiotics) Antiseptics & disinfectants(alcohol,aldehyde,acids, chlorine containing compounds, phenolic compounds, cationic surfactants, dyes, nitrofurans derivatives & floroquinolones) Sulphonamides Antimalaria Anticancer	Internet search		X						

Course Coordinator: Prof. Dr. Sobhy El-Adl

Head of Department: Prof. Dr. Kamel Metwally

Date: 24/9/2018 تم مناقشة واعتماد توصيف المقرر من مجلس القسم المقرر بتاريخ

**COURSE
SPECIFICATIONS**

Radiopharmaceuticals

**Fourth level –Semester 7
2018-2019**

Course specification of Radiopharmaceuticals

University: Zagazig

Faculty: Pharmacy

A- Course specifications:

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

Major or Minor element of programs: Major

Department offering the program: -----

Department offering the course: Pharmacy practice department

Academic year Level: Fourth Level /Seventh semester

Date of specification approval: November 2018

B- Basic information:

Title: Radiopharmaceuticals

Code: PP701

Credit Hours: ---

Lectures: 1 hr/week

Practical: 0

Tutorials: ---

Total: 1 hr/week

C- Professional information:

1-Overall aim of the course

On completion of the course, the student will be able to:

- Illustrate the basic principles of radiopharmaceutics, characteristics, manufacturing techniques, quality control and applications in medical diagnoses and therapy.
- Enumerate guidelines for compounding and dispensing of radiopharmaceuticals.

2- Intended Learning Outcomes of Radiopharmaceuticals (ILO's):

A- Knowledge and Understanding	
a1	Illustrate the fundamentals of atomic and nuclear structure as well as nuclear pharmacy and properties of radiopharmaceuticals.
a2	Describe origin, nature, production of radiation, sources of radionuclides, categories of radiopharmaceuticals and their production and applications
a3	Explain the mechanism of distribution of radiopharmaceuticals within the body
a4	Illustrate the principles of various instruments used for radiation detection and measurement as well as radiopharmaceutical quality control tests
a5	Summarize compounding, labeling and storage guidelines as well as different equations involved in radiopharmaceutical compounding
B- Professional and Practical skills	
b1	Use properly the terminology commonly used in radiopharmacy practice
C- Intellectual skills	
c1	Comprehend good laboratory practice and good storing practice of radiopharmaceuticals
c2	Select the appropriate radiopharmaceutical for diagnosis and therapy
D- General and Transferable skills	
d1	Develop the decision making and problem solving abilities

D- Contents:

Week No.	Lecture contents (1 hrs/lec.)
1	Introduction, Definitions ,Atomic and nuclear structure
2	Radioactivity and ionising radiation Type of radiation Alpha particle, Beta particle ,Gamma ray
3	Radiation measurement: units of radioactivity
4	Type of radioactive decay: Alpha decay, Negatron decay, Positron decay, Electron capture, Isomeric transition.
5	Radioactive Decay rate and the half life
6	Instruments for Radiation Detection and Measurement: Gas-Filled Detectors, Scintillation Detecting Instruments
7	<u>Midterm exam</u>
8	Production of Radionuclide: Cyclotron, Reactor, Radionuclide generator
9	Principle of radionuclide generator 99m-Tc
10	Categories of Radiopharmaceuticals mechanism of distribution of radiopharmaceuticals in the body
11	Application of Radiopharmaceutical Therapeutic Radiopharmaceutical Diagnostic Radiopharmaceuticals
12	Quality Control of Radiopharmaceuticals, Radiopharmaceuticals labeling,Storage of radiopharmaceuticals
13	Dispensing and distribution of radiopharmaceuticals The basic principles for reduction of radiation doses Precautions to be taken in handling of radiopharmaceuticals
14	Some calculations involving radiopharmaceuticals
15	<u>Final written exam</u>

E- Teaching and Learning Methods:

- Lectures
- Think-pair - share

F- Student Assessment methods:

1-Written exams to assess: a1, a2, a3, a4, a5, b1, c1, c2 , d1

Assessment schedule

Assessment (1): Midterm exam	Week 7
Assessment (2): Final exam	Week 15

Weighting of Assessment

Assessment method	Marks	Percentage
Midterm exam	10	10%
final written exam	90	90%
TOTAL	100	100%

G- Facilities required for teaching and learning:

For lectures: Black (white) boards and data show

H- List of References:

1- Course Notes:

Student Handout approved by pharmaceuticals department (2018) will be provided. .

2- Essential Books:

- ✓ Remington: the Science and Practice of Pharmacy” Genars, Alfonso R edition, (2000).
- ✓ Ansel’s Pharmaceutical Dosage Forms and Drug Delivery Systems. By Loyd V. Allen, Jr., Nicholas G. Popovich, Howard C. Ansel, ninth edition.(2011).
- ✓ Fundamentals of Nuclear Pharmacy. By Gopal B. Saha , fifth Edition (2003)
- ✓ Pharmaceutical calculation . By Mitchell J. Stoklosa and Howard C. Ansel, ninth edition 1991

3- Recommended Books

4- Periodicals and websites:

Radiopharmacy, IAEA human health campus

https://humanhealth.iaea.org/HHW/Radiopharmacy/VirRad/Eluting_the_Generator/Generator_Module/Introduction/index.html

Course Coordinator: Prof. Dr. Nagia Ahmed A. El megrab

Head of Department: Assis Prof Gehan Balata

تم مناقشة و اعتماد توصيف المقرر من مجلس القسم بتاريخ 26 / 11 / 2018م

		Matrix I of Radiopharmaceuticals Course								
Course Contents		ILOs of Radiopharmaceuticals course								
		Knowledge and understanding					Professional and practical skills	Intellectual skills		Transferable and general skills
Lectures		a1	a2	a3	a4	a5	b1	c1	c2	d1
1	Introduction, Definitions ,Atomic and nuclear structure	x								
2	Radioactivity, ionising radiation and Type of radiation Alpha particle, Beta particle ,Gamma ray	x								
3	Radiation measurement: units of radioactivity		x			x		x		
4	Type of radioactive decay: Alpha decay, Negatron decay, Positron decay, Electron capture, Isomeric transition.		x							
5	Radioactive Decay rate and the half life	x				x				
6	Instruments for Radiation Detection and Measurement: Gas-Filled Detectors, Scintillation Detecting Instruments				x					
7	Production of Radionuclide: Cyclotron, Reactor, Radionuclide generator		x							
8	Principle of radionuclide generator 99m-Tc		x							
9	Categories of Radiopharmaceuticals mechanism of distribution of radiopharmaceuticals in the body			x						
10	Application of Radiopharmaceutical Therapeutic Radiopharmaceutical								x	x

	Diagnostic Radiopharmaceuticals									
11	Quality Control of Radiopharmaceuticals, Radiopharmaceuticals labeling, Storage of radiopharmaceuticals					x		x		
13	Dispensing and distribution of radiopharmaceuticals The basic principles for reduction of radiation doses Precautions to be taken in handling of radiopharmaceuticals						x			
14	Some calculations involving radiopharmaceuticals					x			x	x

Matrix II of Radiopharmaceuticals course										
National Academic Reference Standards NARS		Program ILOs	Course ILOs	Course contents	Sources	Teaching and learning methods		Weighting of assessment		
						lecture	self-learning	written exam	oral exam	periodical exam
2.1	Principles of basic, pharmaceutical, medical, social, behavioral, management, health and environmental sciences as well as pharmacy practice.	A2	a1	Basic principles of Radiopharmacy	Student book Essential books	x		x		x
				Units of radioactivity and radioactive decay	Student book Essential books	x		x		x
			a2	Types of radiations and their characteristics	Student book Essential books	x		x		x
				Biologic effects of various radiations	Student book Essential books	x		x		x
				Principles of radiation protection	Student book Essential books	x		x		x

2.2	Physical-chemical properties of various substances used in preparation of medicines including inactive and active ingredients as well as biotechnology and radio-labeled products.	A6	a3	General and Ideal characteristics of radiopharmaceuticals	Student book Essential books	x		x		x
2.7	Principles of various instruments and techniques including sampling, manufacturing, packaging, labeling, storing and distribution processes in pharmaceutical industry.	A11	a4	Production of Radionuclide: Cyclotron, Reactor, Radionuclide generator	Student book Essential books	x		x		x
				Principle of radionuclide generator ^{99m} Tc	Student book Essential books	x		x		
2.9	<u>Principles of hospital pharmacy including I.V. admixtures, TPN and drug distribution</u>	A13	a5	Dispensing and distribution of radiopharmaceuticals	Student book Essential books	x		x		

2.17	<u>system</u> <u>Methods of biostatistical analysis and pharmaceutical calculations.</u>	A27								
3.1	Use the proper pharmaceutical and medical terms, abbreviations and symbols in pharmacy practice	B1	b1	Basic principles of Radiopharmacy Units of radioactivity and radioactive decay Types of radiations and their characteristics Biologic effects of various radiations Principles of radiation protection Production of Radionuclide: Cyclotron, Reactor, Radionuclide generator Principle of radionuclide generator 99m-Tc Dispensing and distribution of radiopharmaceuticals	Student book Essential books	x		x		
4.14	Analyze and evaluate evidence-based information needed in pharmacy practice.	C16	c2	Applications of radiopharmaceuticals in medical diagnosis Applications of radiopharmaceuticals in therapy						

4.2	Comprehend and apply GLP, GPMP, GSP and GCP guidelines in pharmacy practice	C2	c1	Quality control of radiopharmaceuticals	Student book Essential books	x		x		
				Stability aspects of radiopharmaceuticals	Student book Essential books	x		x		
				Compounding and dispensing of radiopharmaceutical prescriptions		x		x		
				Some calculations involving radiopharmaceuticals		x		x		
5.10	<u>Implement writing and thinking, problem- solving and decision-making abilities..</u>	D12	d1	Applications of radiopharmaceuticals in medical diagnosis	Student book Essential books	x	x	x		
				Applications of radiopharmaceuticals in therapy	Student book Essential books	x	x	x		

**COURSE
SPECIFICATIONS**

Clinical pharmacy-1

**Fourth level –Semester 7
2018-2019**

Course specification of Clinical pharmacy-1

University: Zagazig Faculty: Pharmacy

A- Course specifications:

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

Major or Minor element of programs: Major

Department offering the program: -----

**Department offering the course: Pharmacology and toxicology
department Academic year Level: Level (4) / Semester (7)**

Date of specification approval:

B- Basic information:

Title: Clinical pharmacy-1

Code: PP 702

Credit Hours: ---

Lectures: 2 hrs/week

Practical: 1hr/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 define therapeutic endpoints, monitoring parameters for efficacy and toxicity, duration of therapy, alternative drug(s). Also, to establish a systematic problem solving approach to the selection of therapeutic regimens based upon specific patient needs to reach therapeutic goal and select the drug of choice, other commonly used drugs for treatment of different cases of diseases, managing and monitoring adverse drug reactions (ADRs).

Finally, to interact effectively with the clinical impressions based on patient presentation and work as a member of a team.

2- Intended Learning Outcomes of Clinical Pharmacy-1 (ILOs)

A- Knowledge and Understanding	
a1	Identify subjective and objectives of selected diseases.
a2	Illustrate monitoring parameters of patient's response and therapeutic agents.
a3	Mention the clinical management of various clinical cases and special populations
a4	Identify patient medication problems.
a5	Identify clinical pharmacy practices that may maximize patient safety.
B- Professional and Practical skills	
b1	Practice the selection of appropriate medication therapy of different disease based on their etiology, patient medical history, possible interactions and age-related factors
b2	Advise patients about the proper safe use of medicines.
b3	Analyze relevant information for clinical case notes
C- Intellectual skills	
c1	Integrate pharmacological and pharmacotherapeutic principles in the proper selection of drug for management of different disease
c2	Calculate the dose for special populations based on age, weight and body surface area.
c3	Evaluate different situations of drug-related and patient-related problems
D-General and Transferable skills	
d1	Work coherently and successfully as a part of a team in assignments
d2	Write reports and present it.
d3	Develop critical thinking, problem solving and decision making skills.

D- Contents:

Week No.	Lecture contents (2 hrs/week)	Practical session (1 hrs/week)
1	Fluids and electrolytes	Case studies on electrolytes
2	Fluids and electrolytes	Case studies on Fluids
3	Fluids and electrolytes	Case studies on osmolarity& osmolality
4	Fluids and electrolytes	Pharmacy calculations-1
5	Fluids and electrolytes	Pharmacy calculations-2 (Activity)
6	Fluids and electrolytes	Case studies on hyponatremia
7	Clinical trials Mid-term exam	Ethics of clinical trials-1
8	Clinical trials	Ethics of clinical trials-2
9	Clinical trials	Case studies on GERD
10	Gastrointestinal diseases	Case studies on peptic ulcer (Activity)
11	Gastrointestinal diseases	Case studies on gastro-intestinal bleeding
12	Gastrointestinal diseases	Case studies on inflammatory bowel disease
13	Gastrointestinal diseases	Practical exam
14	Revision	
15	Final Exam	

E- Teaching and Learning Methods:

- Lectures
- Practical sessions
- Think/pair/share
- Case study

F- Student Assessment methods:

1- Written exams to assess: a1, a2, a3, a4, a5, c1,c2, c3

2- Practical exams to assess: b1, b2, b3, c2, d1,d2,d3

3- Oral exam to assess: a1, a2, a3, a4, a5, c1,c2, c3

4-Midterm exam to assess: a1, a2, a3, a4, a5, c1,c2, c3

Assessment (1): Mid-term exam	Week 7
Assessment (2): activity	Week 5, 10
Assessment (3): Practical exam	Week 13
Assessment (4): Final written exam	Week 15
Assessment (5): Oral exams	Week 15

Weighting of Assessment

Assessment method	Marks	Percentage
Mid-term exam	10	10
Practical exam & activity	25	25
Oral exam	15	15
Written exam	50	50

G- Facilities required for teaching and learning:

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

- For labs: Black (white) boards, data show, formal patients
clinical cases of selected disease states and -
Sphygmomanometers; Glucocheck devices

H- List of References:

Course Notes: Student book of Clinical Pharmacy approved by
pharmacology and Toxicology department, 2020

- **Practical notes of Clinical Pharmacy approved by** pharmacology and
Toxicology department, 2020

2- Essential Books:

Pharmacotherapy. J.T. DiPiro et al (Ed). McGraw Hill, 7th
Edition, 2008.

ii-Applied therapeutics, Mary-Ann Koda-Kimble, Lippincott,
9th Edition, 2009

3- Recommended Books

Textbook of therapeutics, 7th edition. Williams & Wilkins, 2006

4- Periodicals and websites:

www.Pubmed.Comwww.sciencedirect.com

Matrix I of Clinical Pharmacy-1 course

Matrix I of Clinical Pharmacy-1 course															
Course Contents		ILOs of the course													
		Knowledge and understanding					Practical skills			Intellectual skills			General and transferable and skills		
Lectures		a1	a2	a3	a4	a5	b1	b2	b3	c1	c2	c3	d1	d2	d3
1	Fluids and electrolytes	√	√	√	√	√				√	√				
2	Fluids and electrolytes	√	√	√	√	√				√	√				
3	Fluids and electrolytes	√	√	√	√	√				√	√				
4	Fluids and electrolytes	√	√	√	√	√				√	√				
5	Fluids and electrolytes	√	√	√	√	√				√	√				
6	Fluids and electrolytes	√	√	√	√	√				√	√				
7	Clinical trials	√	√	√	√	√				√	√				
8	Clinical trials	√	√	√	√	√				√	√				
9	Clinical trials	√	√	√	√	√				√	√				
10	GIT disease	√	√	√	√	√				√	√				
11	GIT disease	√	√	√	√	√				√	√				
12	GIT disease	√	√	√	√	√				√	√				
13	GIT disease	√	√	√	√	√				√	√				
14	Revision	√	√	√	√	√				√	√				

15	Final exam	√	√	√	√	√				√	√				
Practical sessions		a1	a2	a3	a4	a5	b1	b2	b3	c1	c2	c3	d1	d2	d3
1	Case studies on electrolytes						√	√	√		√		√	√	√
2	Case studies on Fluids						√	√	√		√		√	√	√
3	Case studies on osmolarity& osmolality						√	√	√		√		√	√	√
4	Pharmacy calculations-1						√	√	√		√		√	√	√
5	Pharmacy calculations-2 (Activity)						√	√	√		√		√	√	√
6	Case studies on hyponatremia						√	√	√		√		√	√	√
7	Ethics of clinical trials-1						√	√	√		√		√	√	√
8	Ethics of clinical trials-2						√	√	√		√		√	√	√
9	Case studies on GERD						√	√	√		√		√	√	√
10	Case studies on peptic ulcer (Activity)						√	√	√		√		√	√	√

11	Case studies on gastro-intestinal bleeding						√	√	√		√		√	√	√
12	Case studies on inflammatory bowel disease						√	√	√		√		√	√	√
13	Practical exam						√	√	√		√		√	√	√

Matrix II of Clinical pharmacy 1 course

Matrix II of Clinical pharmacy 1 course												
National Academic Reference Standards (NARS)		Program ILOs	Course ILOs	Course contents	Source	Teaching and learning methods			Method of assessment			
						Lecture	Practical session	Self-learning	Written exam	Practical exam	Mid-term exam	Oral exam
2.1	Principles of basic, pharmaceutical, medical, social, behavioral, management, health and environmental sciences as well as pharmacy practice.	A3	a1	All lectures	Student book, Essential books	√			√		√	√
2.12	Etiology, epidemiology, laboratory diagnosis and clinical features of different diseases and their pharmacotherapeutic approaches.	A20	a2	All lectures	Student book Essential books	√			√		√	√
		A21	a3	All lectures	Student book Essential books	√			√		√	√

2.14	Principles of clinical pharmacology, pharmacovigilance and the rational use of drugs.	A23	a4	All lectures	Student book Essential books Recommended books	√			√		√	√
2.20	Principles of proper documentation and drug filing systems.	A30	A5	All lectures	Student book Essential books Recommended books	√			√		√	√
3.5	Select medicines based on understanding etiology and path physiology of diseases.	B7	b1	All practical sessions	Practical notes Internet		√	√		√		
3.9	Maintain public awareness on rational use of drugs and social health hazards of drug abuse and misuse	B15	b2	All practical sessions	Practical notes Internet		√	√		√		
3.10	Advise patients and other health care professionals about safe and proper use of medicines.	B16	b2	All practical sessions	Practical notes Internet		√	√		√		

3.12	Employ proper documentation and drug filing systems.	B18	b3	All practical sessions	Practical notes Internet		√	√		√		
			b4	All practical sessions	Practical notes Internet		√	√		√		
4.9	Utilize the pharmacological basis of therapeutics in the proper selection and use of drugs in various disease conditions.	C11	c1	All lectures	Student book Essential books Recommended book Internet	√			√		√	√
4.10	Calculate and adjust dosage and dose regimen of medications.	C12	c2	All lectures All practical sessions	Student book Essential books Practical notes	√	√	√	√	√	√	√

4.13	Analyze and interpret experimental results as well as published literature.	C15	c3	All practical sessions	Practical notes Recommended books Internet		√	√		√		
4.14	Analyze and evaluate evidence-based information needed in pharmacy practice.	C16	c3	All practical sessions	Practical notes Recommended books Internet		√	√		√		
5.3	Work effectively in a team	D4	d1	All practical sessions	Recommended books Internet			√		√		
5.9	Implement writing and presentation skills	D11	d2	All practical sessions	Recommended books Internet			√		√		
5.10	Implement writing and thinking, problem- solving and decision-making abilities.	D12	d3	All practical sessions	Recommended books Internet			√		√		

Course Coordinator: Dr. Islam Ahmed

Head of Department: Prof.Dr. Mona Fouad

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

**COURSE
SPECIFICATIONS**

Hospital pharmacy

**Fourth level –Semester 7
2019-2020**

Course specification of Hospital pharmacy

University: Zagazig

Faculty: Pharmacy

A- Course specifications:

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

Major or Minor element of programs: Major

Department offering the program: -----

Department offering the course: Pharmacy Practice Department

Academic year Level: Fourth level/ semester7

Date of specification approval: September 2018

B- Basic information:

Title: Hospital pharmacy Code: PP703

Credit Hours: ---

Lectures: 2 hrs/week

Practical: 1 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 organization and structure of a hospital pharmacy: its facilities and services in inpatient and outpatient pharmacies, medication record, rational drug use, hospital formulary, pharmacy and therapeutic committee, IV admixtures and incompatibilities, parenteral nutrition, handling of narcotics, vaccines, biotechnology products, cytotoxics and radiopharmaceuticals, as well as patient safety and risk management.

3- Intended Learning Outcomes of Hospital pharmacy (ILOs)

A- Knowledge and Understanding	
a1	Outline the organization of a hospital pharmacy and the responsibilities and duties of pharmacists in the hospital pharmacy setting
a2	Define hospital formulary, pharmacy & therapeutic committee and rational drug use
a3	Describe general good dispensing practices of medicines and for special classes of medicines including narcotics, vaccines, biotechnology products, cytotoxics and radiopharmaceuticals
a4	Illustrate different drug related problems and management strategies
a5	Outline different pharmaceutical calculations related to preparation of IV admixtures
B- Professional and Practical skills	
b1	Experience different duties of hospital pharmacist including prescription interpretation, drug preparation in IV unit and drug-drug interaction identification
b2	Handle pharmaceutical preparations safely
b3	Compound different extemporaneous preparations safely and effectively
C- Intellectual skills	
c1	Differentiate between different medication distribution systems
c2	Analyze common hazardous situations contributing to different medication related problems
c3	Evaluate different dispensing practices regarding narcotics,

	biotechnology products, cytotoxics, vaccines and radiopharmaceuticals
D-General and Transferable skills	
d1	Communicate effectively both in oral and written manners
d2	Develop critical thinking , decision making and problem solving abilities
d3	Work effectively in a team

D- Contents:

Week No.	Lecture contents (2 hrs/week)	Practical session (1 hr/week)
1	- Orientation to hospital pharmacy	Introduction
2	- Introduction to Hospital pharmacy -Responsibilities of hospital pharmacist	Translating Medication Orders
3	- Pharmacy and therapeutic committee - Hospital formulary	Translating Medication Orders
4	- Hospital drug distribution systems	Extemporaneous compounding
5	- Dispensing Process - Dispensing of biotechnology products	Extemporaneous compounding
6	Dispensing of radiopharmaceuticals	Illustration of required activity: Items of patient interview Illustration of video criteria
7	Dispensing of vaccines dispensing of cytotoxics Periodical exam	Dry powders for reconstitution
8	Dispensing of controlled drugs	Parenteral admixtures
9	IV admixture and TPN	Practical Preparation to practice
10	Medication errors	Medication errors (Case study)
11	Medication errors (Cont.)	Drug Interactions Checker (internet search & report writing)
12	Pharmacovigilance and adverse drug reactions	video/presentation
13	-Rational drug use	Practical exam
14	- Revision	
15	Final exam	

E- Teaching and Learning Methods:

- Lectures
- Practical sessions
- Think/pair/share
- Case study

F- Student Assessment methods:

- 1- Written exams to assess: a1, a2, a3, a4, c1, c2, c3
- 2- Patient interview & video preparation to assess: b1, d1, d3
- 3- Practical exams to assess: b1, b2, b3, a5, d2
- 4- Oral exam to assess: a1, a2, a3, a4, c1, c2, c3, d1, d2

Assessment schedule

Assessment (1): Midterm exam	Week 7
Assessment (2): Final written exam	Week 15
Assessment (3): Patient interview & video preparation	Week 12
Assessment (4): Practical exam	Week 13
Assessment (5): Oral exam	Week 15

Weighting of Assessment

Assessment method	Marks	Percentage
Midterm exam	10	10%
Final written exam	50	50%
Practical practice & activity	25	25%
Oral exam	15	15%
TOTAL	100	100%

G- Facilities required for teaching and learning:

- For lectures : Black (white) boards, data show, air conditioned classroom
- For practical: Well-equipped labs

- Large volume parenteral, IV supplies, IV antibiotics and corticosteroids, disinfectant, personnel protective supplies

H- List of References:

1- Course Notes: Student book of Hospital pharmacy and clinical pharmacy -1 approved by pharmacy practice department (2020)

2- Essential Books:

- Mark G. Brunton, Hospital Pharmacy Practice for Technician, Jones & Bartlett Learning, USA, 2015.
- Jackson M, Lowey A. Handbook of extemporaneous preparation. A guide to pharmaceutical compounding. Published by Pharmaceutical Press, 2010.
- Brown TR. Handbook of institutional pharmacy practice.4th edition, American Society of Health System Pharmacists. Bethesda, Maryland, 2006.
- Peggy Piascik Peggy, PiascikVal Adams. Dispensing Biotechnology Products: Handling, Professional Education, and Product Information, 2013

3- Recommended Books:

- Martindale, "The extra pharmacopeia". 31st edn., by James, E.F Reynolds. And Kathleen Parfitt, Royal Pharmaceutical Society, London (2007).
- Non-prescription drugs, Po Alain Li Wan, 2nd ed., Oxford Blackwell Scientific publications (1999).
- Cohen MR. Medication Errors. Causes, Prevention, and Risk Management; 8.1-8.23. (2000)
- Holdford DA, Brown TR. Introduction to Hospital & Health System. American Society of Health System Pharmacists. Bethesda, Maryland.

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.
- Flynn E, Barker KN, Carnahan BJ. National observational study of prescription dispensing accuracy and safety in 50 pharmacies. J Am Pharm Assoc. 2003; 43:191–200.
- Ukens C. Deadly dispensing: an exclusive survey of Rx errors by pharmacists. Drug Topics. March 13, 1997:100–11.
- Strategies for Communicating Effectively with Patients, Volume 2016, Course No. 230.

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

<https://www.allaboutcareers.com/careers/job-profile/hospital-pharmacist>

<https://www.slideshare.net/AbdRhmanGamilgamil/pharmacy-practice-67234967>

https://www.drugs.com/drug_interactions.html

www.usp.org/reporting/review/qr66.pdf

<https://www.slideshare.net/rameshganpisetti/14ab1t0003-handling-of-radiopharmaceuticals>, 2018

Course Coordinator: Dr. Gehan Fathy Attia

Head of Department: Dr. Gehan Fathy Attia

Date: تم مناقشة و اعتماد توصيف المقرر من مجلس القسم بتاريخ 9 / 2018 م

Matrix I of Hospital pharmacy course															
Course Contents		ILOs of Hospital pharmacy course													
		knowledge and understanding					Professional and practical skills			Intellectual skills			Transferable and general skills		
Lectures		a1	a2	a3	a4	a5	b1	b2	b3	c1	c2	c3	d1	d2	d3
1	Orientation to hospital pharmacy	x													
2	Introduction to Hospital pharmacy -Responsibilities of hospital pharmacist	x													
3	Pharmacy and therapeutic committee - Hospital formulary		x												
4	Hospital drug distribution systems			x						x					
5	Dispensing Process Dispensing of biotechnology products	x		x											
6	Dispensing of radiopharmaceuticals	x		x								x			
7	Dispensing of vaccines Dispensing of cytotoxics	x		x								x			
8	Dispensing of controlled drugs	x		x								x			
9	IV admixtures and TPN	x													
10	Medication errors	x			x						x				

11	Pharmacovigilance and adverse drug reactions	x			x					x			
12	Rational drug use	x	x							x			
Practical session													
1	Translating Medication Orders						X				x	x	x
2	Extemporaneous compounding					x	X	x			x	x	x
3	Dry powders for reconstitution (Problem solving)					x	X		x		x	x	x
4	Parenteral admixtures (Problem solving)					x	X		x		x	x	x
5	Practical Preparation to practice					x	X		x		x	x	x
6	Medication errors (Case study)						X			x	x	x	x
7	Drug Interactions Checker (internet search & report writing)						X			x		x	x
8	Patient interview & video preparation						x				x	x	x

Matrix II of Hospital pharmacy course

National Academic Reference		Program ILOs	Course ILOs	Course contents	Sources	Teaching and learning methods			Weighting of assessment			
						lecture	practical session	case study/ think-pair-share	written exam	practical exam	oral exam	Midterm exam
Standards NARS												
2.1	Principles of basic, pharmaceutical, medical, social, behavioral, management, health and environmental sciences as well as pharmacy practice.	A4	a1	- Orientation to hospital pharmacy - Introduction to Hospital pharmacy -Responsibilities of hospital pharmacist	Student book Essential books	x			x		x	x
			a2	Pharmacy therapeutic committee and -Hospital formulary	Student book Essential books	x			x		x	x
2.9	Principles of hospital pharmacy including I.V. admixtures, TPN and drug distribution system,	A13	a3	Hospital drug distribution systems Dispensing of vaccines, biotechnology products, cytotoxics	Student book Essential books	x			x		x	x

				Dispensing of controlled drugs Dispensing of radiopharmaceuticals								
			a4	Pharmacovigilance and adverse drug reactions Rational drug use Drug distribution	Student book Essential books	x			x		x	x
2.17	Methods of biostatistical analysis and pharmaceutical calculations.	A27	a5	Extemporaneous compounding Dry powders for reconstitution Parenteral admixtures Practical Preparation to practice	Practical notes	x			x		x	x
3.2	Handle and dispose chemicals and pharmaceutical preparations safely.	B2	b1	Translating Medication Orders Dry powders for reconstitution Parenteral admixtures Practical Preparation to practice	Practical notes		x	x		x		
			b2	Extemporaneous compounding	Practical notes		x	x		x		

3.3	Compound, dispense, label, store and distribute medicines effectively and safely	B3	b3		Practical notes		x	x		x		
4.2	Comprehend and apply GLP, GMP, GSP and GCP guidelines in pharmacy practice.	C2	c1	Hospital drug distribution systems	Student book practical notes		x		x		x	x
			c3	Dispensing of radiopharmaceuticals, biotechnology products, cytotoxics Dispensing of vaccines Dispensing of controlled drugs								
4.11	Assess drug interactions, ADRs and pharmacovigilance	C13	c2	Drug Interactions Checker Medication errors Pharmacovigilance and adverse drug reactions Rational drug use	Student book practical notes		x		x		x	x
5.1	Communicate clearly by verbal and written means	D1	d1	Translating Medication Orders Extemporaneous compounding Dry powders for reconstitution	Practical notes Recommended books Internet	x	x	x			x	

5.3	Work effectively in a team.	D4	d3	Parental admixtures Medication errors Drug Interactions Checker				x					
5.10	Demonstrate critical thinking, problem-solving and decision-making abilities	D12	d2	Practical Preparation practice to			x						
								x	x	x	x	x	x

Course Coordinator: Dr. Gehan Fathy Attia

Head of Department: Dr. Gehan Fathy Attia

Date: تم مناقشة و اعتماد توصيف المقرر من مجلس القسم بتاريخ 9 / 2018 م

**COURSE
SPECIFICATIONS**

**Controlled drug delivery
systems**

**Fourth level –Semester 7
2018-2019**

Course specification of controlled drug delivery systems

University: Zagazig **Faculty:** Pharmacy

A- Course specifications:

Program (s) on which the course is given: Bachelor of Pharmacy
(Clinical pharmacy)
Major or minor element of programs: Major
Department offering the program: -----
Department offering the course: Pharmaceutics department
Academic year level: Fourth level/ seventh semester
Date of specification approval: September 2018

B- Basic information:

Title: Controlled drug delivery Code: PT 710

Credit Hours:

- Lectures: 2 hrs/ week
- Practical: -----
- Tutorials: -----
- Total: 2 hrs /week

C- Professional information:

1- Overall aim of the course

On completion of the course, the student will be able to:

- Describe the characters and formulation of drug delivery dosage forms.
- Analyze the best method for preparation and determine the ideal character of each.

2- Intended Learning Outcomes of Controlled drug delivery Systems (ILOs):

A- Knowledge and Understanding	
a1	Enumerate the properties, advantages, disadvantages and applications of different drug delivery systems including liposomes, niosomes, nanoparticles, microspheres, microemulsion, ..etc
a2	Describe the formulation of different drug delivery systems including liposomes, niosomes, nanoparticles, microspheres, microemulsion, ..etc
B- Professional and Practical skills	
---	-----
C- Intellectual skills	
c1	Differentiate between different drug delivery systems based on their feasibility of formulation and stability.
c2	Select the proper ingredients used in the formulation of different drug delivery systems.
D- General and Transferable skills	
d1	Develop self-learning, computer and presentation skills.
d2	Demonstrate critical thinking and decision making skills.

D- Contents:

Week No.	Lecture (2 hrs/week)
1	Basic concepts: -Rational for extended release pharmaceutical -Advantages and disadvantages -Terminology & Kinetic mechanism
2	
3	
4	Extended-release technologies for oral dosage forms (Coated Beads, Granules, Microspheres & Microencapsulation techniques)
5	
6	
7	Periodical exam
8	Mechanism aspects of Oral drug delivery formulation
9	Colloidal Drug Delivery Systems
10	Liposomes: (Definition , preparation, Components & Applications)
11	Niosomes
12	Microemulsion
13	Nanoparticles
14	Activity (Presentation)
15	Final written exam

E- Teaching and Learning Methods:

- Lectures
- Self-learning: Activity; internet search about different topics and presentation.

F- Student Assessment Methods:

- Written exam to assess: a1, a2, c1, c2, d2
- Oral exam to assess: a1, a2, c1, c2, d2
- Periodical exam to assess: a1, a2, c1, c2, d2
- Activity (Presentation) to assess: d1

Assessment schedule:

Assessment (1): Written exam	Week 15
Assessment (2): Oral exam	Week 15
Assessment (3): Periodical exam	Week 7
Assessment (4): Activity	Week 14

Weighing of Assessment

Assessment method	Marks	Percentage
Written exam	75	75%
Oral exam	15	15%
Periodical exam & activity	10	10%
TOTAL	100	100%

G- Facilities required for teaching and learning:

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

H- List of References:

1- Course Notes: Student book of Controlled drug delivery systems approved by Pharmaceutics department 2018.

2- Essential books:

- i- Controlled Release in Oral Drug Delivery (Advances in Delivery Science and Technology) Clive G. Wilson, Patrick J. Crowley, 425, 2011
- ii- Design of Controlled Release Drug Delivery Systems (McGraw-Hill Chemical Engineering) Xiaoling Li, 435, 2005

3- Recommended books:

- i- Modified-Release Drug Delivery Technology (Drugs and the Pharmaceutical Sciences) Michael Rathbone, Jonathan Hadgraft, Michael S. Roberts , 1032, 2002.

4- Periodicals and websites:

www.Pubmed.Com

www.sciencedirect.com

Course Coordinators: Prof. Dr. Hanan El-Nahas

Head of department: Prof. Dr. Nagia El-megrab

Date: تم مناقشة و اعتماد توصيف المقرر من مجلس القسم بتاريخ 9 / 2018 م

Matrix-1 of Controlled drug delivery systems course							
Course Contents		ILOs of Controlled drug delivery systems					
		knowledge and understanding		intellectual skills		Transferable and general skills	
Lectures		a1	a2	c1	c2	d1	d2
1	Basic concepts:						
	-Rational for extended release pharmaceutical	x		x			x
2	-Advantages and disadvantages						
	-Terminology & Kinetic mechanism						
3	Extended-release technologies for oral dosage forms (Coated Beads, Granules, Microspheres & Microencapsulation techniques)						
4		x	x	x	x		x
5							
6	Extended release dosage form (Osmotic pump, Gastro-retentive system & floating system)	x	x	x	x		x
7	Periodical exam	x	x	x	x		x
8	Mechanism aspects of Oral drug delivery formulation	x		x			
9	Colloidal Drug Delivery Systems	x	x	x	x	x	x
10	Liposomes: (Definition , preparation, Components & Applications)	x	x	x	x	x	x
11	Niosomes	x	x	x	x	x	x
12	Microemulsion	x	x	x	x	x	x
13	Nanoparticles	x	x	x	x	x	x
14	Activity (Presentation)					x	
15	Final written exam	x	x	x	x		x

Matrix II of Controlled drug delivery 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	periodical exam
2.2	Physical-chemical properties of various substances used in preparation of medicines including inactive and active ingredients as well as biotechnology and radio- labeled products.	A5	a1	Lectures (1-13)	Student book Essential books	x			x		x	x
2.6	Properties of different pharmaceutical dosage forms including novel drug delivery systems.	A10	a2	Lectures (3-13)	Student book Essential books	x			x		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	Lectures (1-13)	Student book Essential books	x			x		x	x

			c2	Lectures (3-13)	Student book Essential books				x		x	x
5.5	Practice independent learning needed for continuous professional development	D7	d1	Activity	internet			x				x
5.9	Implement writing and presentation skills.	D11										
5.10	Demonstrate critical thinking, problem-solving and decision-making abilities	D12	d2	Lectures (1-13)				x	x		x	x

Course Coordinators: Prof. Dr. Hanan El-Nahas

Head of department: Prof. Dr. Nagia El-megrab

Date: تم مناقشة و اعتماد توصيف المقرر من مجلس القسم بتاريخ 2018/ 9 / م

**COURSE
SPECIFICATIONS**

**Public health &
preventive medicine
Fourth level –Semester 7
2018-2019**

Course specification of Public Health & preventive medicine

University: Zagazig

Faculty: Pharmacy

A- Course specifications:

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

Major or Minor element of programs: Major

Department offering the program: -----

Department offering the course: Microbiology and Immunology

Academic year Level: : 4th level/7th semester

Date of specification approval: September 2018

B- Basic information:

Title: Public health & preventive medicine

Code: MD-710

Lectures: 2 hrs/week

practical : -----

Total: 2 hrs/week

C- Professional information:

1-Overall aim of the course

On completion of the course, the student will be able to: Illustrate the basic concepts of public health including general topics in Epidemiology and control of infectious diseases (definitions, prevention and control of infectious diseases), Environmental health (air pollution, water pollution, food sanitation, proper residential environment, refuse and sewage disposal, occupational diseases and industrial health), Nutrition, Malnutrition, Overpopulation, Family planning and bioterrorism

2- Intended Learning Outcomes of Public health & preventive medicine (ILOs)

A- Knowledge and Understanding	
a1	Recognize the basic concepts of public health including epidemiology and List the different types of epidemiology studies and give an example of a study design used for each type
a2	Describe methods of environmental sanitation and control (such as water and food supplies, waste disposal, food handling, and housing).
a3	Illustrate the major topics associated with bioterrorism and nosocomial infections
a4	Illustrate strategies of health nutrition, family planning, and enumerate other strategies related to maternal and child health care programs
C- Intellectual skills	
c1	Identify different causes of diseases and environmental risk situation
c2	Suggest different strategies for disease prevention
c3	Analyze epidemiologic data about disease in a population, changes in human morbidity and mortality over time based on calculation of prevalence rate, incidence rate, relative risk, and/or odds ratio
D-General and Transferable skills	
d1	Communicate effectively both in oral and written manners
d2	Acquire online search skills through writing reports and researches
d3	Develop critical thinking and problem solving skills .

D- Contents:

Week No.	Lecture contents (2 hrs/week)
1	Introduction to public health and epidemiology
2	Environmental health: Air pollution introduction to Water supply & sanitation
3	Environmental health: ○ Disease transmitted by water ○ Controlling waterborne disease ○ Purification of water ○ Standard of safe water supply
4	○ Food sanitation ○ Milk sanitation & Milk- borne disease ○ Food poisoning (Food-borne illness) ○ General measures for safe food
5	Refuse, sewage and Wastes disposal ● Hazards of improper Wastes disposal ● Sewage treatment Occupational diseases and industrial health
6	Nutrition, malnutrition and nutritional deficiency diseases
7	○ Terms used for various forms of outbreaks ○ Classification of infectious diseases ○ Epidemiological Model ○ Midterm exam
8	Specific measurements: I. Morbidity rates II. Mortality rates ● Problem solving
9	Study Designs in Epidemiology Epidemiological study methods: - Descriptive & Analytical studies: 1. Cohort studies 2. Case-control studies
10	○ Nosocomial infections ○ Bioterrorism
11	○ Immunization and vaccination programs
12	○ Family planning & Overpopulation ○ Activity (report)

13	○ Revision
14	○ Revision
15	○ Written exam

E- Teaching and Learning Methods:

- Lectures
- Case study
- Report writing

F- Student Assessment methods:

1- Written exams to assess: a1, a2, a3, a4, c1, c2, c3

2- written report to assess: d1, d2

3- Oral exam to assess: a1, a2, a3, a4, c1, c2, c3, d1, d3

Assessment schedule

Assessment (1): Midterm exam	Week 7
Assessment (2): Final written exam	Week 15
Assessment (3): Activity (Report)	Week 12
Assessment (4): Oral exams	Week 15

Weighting of Assessment

Assessment method	Marks	Percentage
Final exam (including questions on activity)	75	75%
Midterm exam	10	10%
Oral exam	15	15%
TOTAL	100	100%

G- Facilities required for teaching and learning:

- For lectures : Black (white) boards, data show, classroom

H- List of References:

1- **Course Notes:** Student book of:- public health approved by :-

2- Essential Books:

- 1) Pharmacy in Public Health: Basics and Beyond. *By Jean Carter and Marion Slack*, 2010.
- 2) **Foodborne disease outbreaks: Guidelines for investigation and control.** **Publisher:** World Health Organization, 2008.
- 3) **Global Burden of Disease and Risk Factors** by **Alan D. Lopez, Colin D. Mathers, Majid Ezzati** - **World Bank Publications** , 2006.

3- Recommended Periodicals and websites:

- <http://medicaleducationonline.org/>
- <http://www.who.int/>
- <http://www.who.int/countries/egy/en/>

Course Coordinator: Assistant Prof. Hisham abbas

Head of Department: Prof / Nehal Elsayed yousef

Date 2018/9/ 30 تم مناقشة و اعتماد توصيف المقرر من مجلس القسم بتاريخ

Matrix I of public health & preventive medicine

Course content		Knowledge and Understanding				Intellectual skills			Transferable & general skills		
		a1	a2	a3	a4	c1	c2	c3	d1	d2	d3
1	Introduction to public health & epidemiology	x									
2	Environmental health: Air pollution introduction to Water supply		x			x					
3	Disease transmitted by water & controlling of waterborne diseases Purification of water Standard of safe water supply		x			x				x	
4	o Food sanitation o Milk sanitation & Milk- borne disease o Food poisoning o measures for safe food		x			x					
5	Refuse, sewage and Wastes disposal Hazards of improper Wastes disposal Sewage treatment Occupational diseases and industrial health		x			x					
6	Nutrition, malnutrition and nutritional deficiency diseases				x		x				
7	Terms used for various forms of outbreaks o Classification of infectious diseases o Epidemiological Model	x						x			
8	Specific measurements: I. Morbidity rates	x						x			x

	II. Mortality rates Problem solving										
9	Study Designs in Epidemiology Epidemiological study - Descriptive & Analytical studies	x						x			
10	- Nosocomial infections - Bioterrorism			X			x				
11	Immunization and vaccination programs				X						x
12	- Family planning & Overpopulation Activity (report)				x				x	x	x
13	Revision	x	x	x	x	x	x	x			

	sanitation, disinfection, sterilization methods and microbiological QC of pharmaceutical products.	medicine.		○ Milk sanitation & Milk- borne disease ○ Food poisoning ○ measures for safe food Refuse, sewage and Wastes disposal Hazards of improper Wastes disposal Sewage treatment Occupational diseases and industrial health						
			a4	Nutrition, malnutrition and nutritional deficiency diseases Immunization and vaccination programs ○ Family planning & Overpopulation Activity (report)	Student book Essential books	×	×	×	×	×
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.	[A16] Demonstrate the principles of normal and abnormal bodily functions in healthy and diseased states.	a3	○ Nosocomial infections ○ Bioterrorism	Student book & Essential book					
4.8	4.8 Select and assess appropriate methods of infection control to prevent	(C9) Select the most appropriate method for infection control.	C2	Nutrition, malnutrition and nutritional deficiency diseases Immunization and	Student book & essential book	×	×	×	×	×

	infections and promote public health.		vaccination programs ○ Family planning & Overpopulation ○ child and mother care programs						
			Activity (report)						
	[C10] Employ the knowledge concerning different microbial and parasitic diseases for promotion of community health.	C1 C3	Terms used for various forms of outbreaks Classification of infectious diseases Epidemiological Model: I. Morbidity rates II. Mortality rates Problem solving Study Designs in Epidemiology Epidemiological study - Descriptive & Analytical studies Environmental health: Air pollution introduction to Water supply Disease transmitted by water & controlling of waterborne diseases Purification of water Standard of safe water supply Food sanitation Milk sanitation & Milk- borne disease Food poisoning	Essential book & internet research	×		×	×	×

5.1	Communicate clearly by verbal and means.	[D1] Interact effectively with patients, the public and health care professionals, either by writing or orally.	d1	Family planning (Activity -report)	Internet search	×	×		×	
5.2	5.2 Retrieve and evaluate information from different sources to improve professional competencies	[D2] Perform online computer search to develop information technology skills and knowing how to retrieve information from a variety of sources.	d2	Purification of water Standard of safe water supply (Activity -report)	Internet search	×		×		×
5.10	5.10 Implement writing and thinking, problem-solving and decision-making abilities.	D12 Develop critical thinking, problem solving and decision making skills	D3	Specific measurements: I. Morbidity rates II. Mortality rates Problem solving ○	Essential book & online book	×		×	×	×

**COURSE
SPECIFICATIONS**

**Pharmaceutical
Biotechnology
Fourth level –Semester 7
2018-2019**

Course specification of pharmaceutical biotechnology

University: Zagazig

Faculty: Pharmacy

A- Course specifications:

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

Major or Minor element of programs: Major

Department offering the program: -----

Department offering the course: Microbiology and Immunology

Academic year Level: Fourth level - 7th semester

Date of specification approval: September 2018

B- Basic information:

Title: pharmaceutical biotechnology

Code: PM703

Lectures: 2 hrs/week

Practical: 1 hrs/week

Total: 3 hrs/week

C- Professional information:

1-Overall aim of the course

- **On completion of the course, the student will be able to:**

Identify the basic principles of microbial biotechnology and fermentation and their applications. Understand the gene cloning and recombinant DNA technology technique and their applications. Apply the biotechnology techniques in production of certain valuable products such as vitamins, antibiotics and vaccines. Communicate effectively with public, patients and other health care professionals in addition to working effectively as a member of a team, writing and presenting reports.

2- Intended Learning Outcomes of pharmaceutical biotechnology (ILOs)

A- Knowledge and Understanding	
a1	Outline the basic principles of microbial biotechnology and fermentation and their applications
a2	Identify the basic principles of microbial biotechnology and fermentation
a3	Recognize the applications of biotechnology and fermentation
a4	Describe gene cloning and recombinant DNA technology technique and their applications
B- Professional and Practical skills	
b1	Use the proper terms of biotechnology
b2	Handle basic laboratory equipments, chemicals and biohazards effectively and safely.
C- Intellectual skills	
c1	Apply biotechnology techniques in production of antibiotics, vitamins and vaccines
c2	Use the biotechnology techniques in the production and screening of primary and secondary metabolites
c3	Analyze and interpret experimental results to give clear advice and critical decisions about patient's state
D-General and Transferable skills	
d1	Communicate effectively both in oral and written manner
d2	Perform online computer search for writing reports
d3	Work effectively as a member of a team
d4	Adopt the ethical values, legal measures and safety guidelines.
d5	Write and present reports

D- Content

Week	Lecture contents (2 hrs/week)	Practical session (1 hr/Lab)
1	Microbial biotechnology and fermentation	Lab rules
2	Fermentation system and fermentation processing	Fermentation media
3	Production of microbial biomass	Industrial fermentation and production of citric acid (primary metabolite) <u>Assignment</u>
4	Production of primary metabolites: alcohols, organic acids, amino acids and polysaccharides	Production of penicillin by fermentation (secondary metabolite) <u>Assignment</u>
5	- Production of secondary metabolites: antibiotics, vitamins, insecticides - Production of microbial enzymes	Production of vitamin B12 by fermentation (secondary metabolite) <u>Assignment</u>
6	- Biotransformation - Production of immunological products and their quality control - Production of bacterial and viral vaccines	DNA extraction <u>Assignment</u>
7	<u>midterm exam</u>	

8	Gene cloning and recombinant DNA technology: a- Obtaining target gene b- Selection of cloning vector	Gel Electrophoresis <u>Assignment</u>
Ninth Week	Gene cloning and recombinant DNA technology: c- Making recombinant DNA inserts	Polymerase chain reaction <u>Assignment</u>
Tenth Week	Gene cloning and recombinant DNA technology: d- Introduction of recombinant DNA molecule into a host cell and selection of target clone	Cloning <u>Assignment</u>
Eleventh week	Production of human proteins: insulin, interferon, growth hormone, anticoagulants, interleukins	Cloning (horizontal gene transfer) <u>Assignment</u>
Twelfth Week	- Chemical synthesis of DNA - DNA sequencing	<u>Final practical exam -</u>
Thirteenth week	Applications of recombinant DNA technology: 1- Biomass utilization	
Fourteenth week	Applications of recombinant DNA technology: 2-Microbial insecticides and bio-control.	
Fifteenth week	<u>Final written exam</u>	

E- Teaching and Learning Methods:

- Lectures
- practical sessions
- activity (assignments)
- videos /animations

F- Student Assessment methods:

- 1- Written exams to assess: a1, a2, a3, a4,b1, b2,c1, c2, c3
- 2- Assignments to assess: d1, d2,d3,d4, d5

4- Oral exam to assess: a1, a2, a3, a4,b1, c1, c2, c3

Assessment schedule

Assessment (1): assignments	Weeks 3 – 11
Assessment (2): midterm exam	Week 7
Assessment (3): Practical exam	Week 12
Assessment (4): Oral exam	Week 15
Assessment (5): final written exam	Week 15

Weighting of Assessment

Assessment method	Marks	Percentage
Final written exam	50	50%
Practical exam & assignments	25	25%
Midterm	10	10%
Oral exam	15	15%
TOTAL	100	100%

G- Facilities required for teaching and learning:

•For lectures Black (white) boards, air conditioned lab room and data show

H- List of References:

1- Course Notes: Student book of "Notes in pharmaceutical biotechnology" approved by Microbiology & Immunology department.

2- Essential Books:

✓ "Molecular Biotechnology", Pasternak G, ASM press, Washington DC (1994).

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:

- ✓ www.Pubmed.com
- ✓ www.sciencedirect.com

Course Coordinator: Prof. Dr. Ashraf Ahmed Kadry Yousef.

Head of Department: Prof / Nehal Elsayed yousef

Date 2019/9/ 30 تم مناقشة و اعتماد توصيف المقرر من مجلس القسم بتاريخ

Matrix 1 of Pharmaceutical Biotechnology course

Course Contents		Knowledge and understanding			a4	Professional and Practical skills		Intellectual skills			General and Transferable skills				
		a1	a2	a3		b1	b2	C1	C2	C3	d1	d2	d3	d4	d5
1	Microbial biotechnology and fermentation Practical : lab role	√													
2	• Fermentation system and fermentation processing • Practical : Fermentation media	√	√			√			√						
3	• Production of microbial biomass • Practical : Industrial fermentation and production of citric acid (primary metabolite) • Assignment		√			√			√			√			√
4	• Production of primary metabolites: alcohols, organic acids, amino acids and polysaccharides • Practical : Production of penicillin by fermentation (secondary metabolite) • Assignment		√	√					√			√			√
5	• Production of secondary metabolites: antibiotics, vitamins, insecticides		√	√				√				√			√

	• Production of microbial enzymes • Practical : Production of vitamin B12 by fermentation (secondary metabolite) • Assignment													
6	• Biotransformation • Production of immunological products and their quality control • Production of bacterial and viral vaccines • Practical : DNA extraction • Assignment	√	√	√			√	√				√		√
7	• Gene cloning and recombinant DNA technology: Obtaining target gene • Practical : Electrophoresis Assignment	√	√		√		√	√				√		√
8	• Gene cloning and recombinant DNA technology: Selection of cloning vector • Practical : Polymerase chain reaction • Assignment	√	√		√		√	√				√		√

9	- Gene cloning and recombinant DNA technology: c- Making recombinant DNA inserts Practical: Cloning Assignment	✓	✓		✓		✓	✓				✓			✓
10	- Gene cloning and recombinant DNA technology: d- Introduction of recombinant DNA molecule into a host cell and selection of target clone Practical : Cloning (horizontal gene transfer) Assignment		✓		✓		✓	✓				✓			✓
11	Production of human proteins: insulin, interferon, growth hormone, anticoagulants, interleukins		✓	✓				✓							
12	- Chemical synthesis of DNA - DNA sequencing		✓												
13	Applications of recombinant DNA technology: Biomass utilization		✓	✓	✓			✓							
14	Applications of recombinant DNA technology: Microbial insecticides and bio-control		✓	✓	✓			✓							

Matrix 2 of Pharmaceutical Biotechnology course

National Academic Reference Standards NARS	Program ILOs	Course ILOs	Course contents	Sources	Teaching and learning methods			Method of assessment			
					Lecture	Self learning	Practical session	midterm exam	Practical exam	Oral Exam	Written exam
2.2 Physical-chemical properties of various substances used in preparation of medicines including inactive and active ingredients as well as biotechnology and radio- labeled products	(A6) Summarize physico-chemical properties of medicines, biological products and radio-pharmaceuticals focusing on thermodynamics, chemical kinetics and assessment of their chemical and physical stabilities	a1 a2	• Microbial biotechnology and fermentation Fermentation system and fermentation processing • Production of microbial biomass • Production of primary metabolites • Production of secondary metabolites • Biotransformation • Production of immunological products and their quality control • Production of bacterial and viral vaccines • Gene cloning and recombinant DNA technology: (Obtaining target gene, Selection of cloning vector and Making recombinant DNA inserts)	Notebook	√		√	√		√	√

			• Introduction of recombinant DNA molecule into a host cell and selection of target clone • Production of human proteins: insulin, interferon, growth hormone, anticoagulants, interleukins • Chemical synthesis of DNA • DNA sequencing • Applications of recombinant DNA technology: Biomass utilization Microbial insecticides and bio-control									
2.4. Principles of isolation, synthesis, purification, identification, and standardization methods of pharmaceutical compounds	A8 Illustrate the basics of separation, synthesis, purification, identification and standardization methods of biologically active compounds	a3 a4	• Production of primary metabolites • Production of secondary metabolites • Production of microbial enzymes • Biotransformation • Production of immunological products and their quality control • Production of bacterial and viral vaccines • Production of human proteins: insulin, interferon, growth hormone, anticoagulants, interleukins • Applications of recombinant DNA technology (Biomass	Notebook	√		√	√		√	√	√

			utilization, Microbial insecticides and bio-control)								
3.1 Use the proper pharmaceutical and medical terms, abbreviations and symbols in pharmacy practice.	[B1] Use effectively the medical and pharmaceutical terminologies, medical abbreviations, idioms, suffixes and prefixes.	b1	• Fermentation system and fermentation processing • Production of microbial biomass	Notebook	√		√	√		√	√
3.6 Monitor and control microbial growth and carry out laboratory tests for identification of infectious and non-infections in biological specimens	[B10] Handle biological specimens safely.	b2	• Biotransformation • Production of immunological products and their quality control • Production of bacterial and viral vaccines • Gene cloning and recombinant DNA technology: • Obtaining target gene • Selection of cloning vector • Making recombinant DNA inserts • Introduction of recombinant DNA molecule into a host cell and selection of target clone	Notebook	√		√	√		√	√

4.5 Select the appropriate methods of isolation, synthesis, purification, identification, and standardization of active substances from different origins.	C6] Select the appropriate methods of isolation, synthesis, purification, identification, and standardization of active substances from different origins.	C2	• Fermentation system and fermentation processing • Production of microbial biomass • Production of primary metabolites: alcohols, organic acids, amino acids and polysaccharide	Notebook	√		√	√		√	√
4.7 Apply various principles to determine the characteristics of biopharmaceutical products	[C8] Summarize different molecular genetic techniques to produce and improve biopharmaceutical products from living organisms.	C1	○ Production of secondary metabolites: antibiotics, vitamins, insecticides ○ Production of microbial enzymes ○ Biotransformation ○ Production of immunological products and their quality control ○ Production of bacterial and viral vaccines • Gene cloning and recombinant DNA technology: • Obtaining target gene • Selection of cloning vector • Making recombinant DNA inserts • Introduction of recombinant DNA molecule into a	Notebook and internet	√		√	√		√	√

			host cell and selection of target clone • Production of human proteins: insulin, interferon, growth hormone, anticoagulants, interleukins								
4.14 Analyze and evaluate evidence-based information needed in pharmacy practice.	[C16] Apply evidence-based guidelines and professional principles in pharmacy practice with other healthcare professionals.	c3			√		√	√		√	√

5.1 Communicate clearly by verbal and means.	[D1] Interact effectively with patients, the public and health care professionals, either by writing or orally.	d1	Including practical sessions and assignments	Practical sessions		✓	✓		✓	✓	
5.3 Work effectively in a team.	[D4] Implement tasks as a member of a team.	d3	Including all assignments in practical sessions	Internet		✓			✓		

5.6 Adopt the ethical values, legal measures and safety guidelines.	[D8] Adopt the ethical values, legal measures and safety guidelines.	d4	Including all assignments in practical sessions	Internet		√			√		
5.2 Retrieve and evaluate information from different sources to improve professional competencies.	[D2] Perform online computer search to develop information technology skills and knowing how to retrieve information from a variety of sources	d2 , d5	Including all assignments in practical sessions	Internet		√			√		

**COURSE
SPECIFICATIONS**

Pharmaceutical

Microbiology

Fourth level –Semester 7

2018-2019

Course specification of Pharmaceutical Microbiology **(4th level)**

A- Course specifications:

- Programme (s) on which the course is given: Bachelor of pharmacy (Clinical Pharmacy)
- Major or Minor element of programs: Major
- Department offering the program: -----
- Department offering the course: Microbiology and Immunology
- Academic year: 4th level (7th semester)
- Date of specification approval: 2018/2019

B- Basic information:

- Title: Pharmaceutical Microbiology
- Course code: **PM 704**
- Lectures: 2 hrs/week
- Practical: 1 hr/week
- Tutorials: ----
- Total: 3hrs/week

C- Professional information:

1. Overall Aims of the Course:

On completion of the course, the student will be able to:

- Illustrate the different types of antimicrobial agents as well as the sources and control of microbial contamination of the pharmaceutical products. Outline the concepts of sterilization, its different methods, applications and sterility testing. Perform tests for standardization of different antimicrobial agents. Select the suitable antimicrobial agent for each infection and the appropriate preservative for formulation of pharmaceutical preparations.

- Develop the critical thinking skills and communicate efficiently with patients and health care professionals. In addition to group working.

2. Intended Learning Outcomes (ILOS):

Knowledge and Understanding	
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
a4	Outline the principles of sterility testing and sterility assurance
a5	Illustrate the concepts of microbiological quality control of pharmaceutical products and evaluation of preservatives
Professional and Practical skills	
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
Intellectual skills	
c1	Select the appropriate preservative for effective formulation of pharmaceutical preparations
c2	Apply GMP guidelines in preparation of pharmaceutical products
c3	Select the most suitable antimicrobial agent for each infection
c4	Select the most suitable antimicrobial agent to promote the community health
c5	Analyze and interpret experimental results in suitable form
General and Transferable skills	
d1	Communicate efficiently with patient, public, and health care professional.
d2	Acquire online search skills
d3	Work effectively as a member of a team
d4	Adopt the ethical values, legal measures and safety guidelines.
d5	Write reports and present them.
d6	Develop the critical thinking and decision-making for interpretation of experimental results

3. Course Content of Pharmaceutical Microbiology:

Weeks	Lecture contents (2hrs/lec.)	Practical session (1 hr/lab)
First week	• Introduction • Definitions and terminology • Antibiotic and chemotherapeutic agents - Mechanisms of action of antimicrobial agents	• Laboratory safety measures • Bacterial counts: total count, viable count
Second week	• Classification of antimicrobial agents: - Drugs acting on cell wall - Drugs acting on cell membrane	• Sterility testing • Antibiotic susceptibility testing: Kirby-Bauer method
Third week	• Classification of antimicrobial agents: - Drugs inhibiting protein synthesis - Drugs inhibiting nucleic acid synthesis - Antimetabolites	• Demonstration of spectrum of action by strip-plate method • Demonstration of interaction between two antimicrobial agents
Fourth week	• Antituberculous drugs • Antileprosy agents • Antifungal drugs • Antiprotozoal drugs • Antiviral drugs • Microbial resistance to antimicrobial agents - Microbial assay of Antibiotics and vitamins	• Determination of Minimum inhibitory concentration (M.I.C.) by broth dilution
Fifth week	• Disinfection and antisepsis: chemical agents used as disinfectant and antiseptic	• Determination of Minimum inhibitory concentration (M.I.C.) by Agar diffusion method • Activity (Report)
Sixth week	• Factors affecting the activity of disinfectant and antiseptic • Evaluation of disinfectant and antiseptic	• Antibiotic assay
Seventh	• Sources of microbial contamination and	• Midterm exam

week	spoilage of pharmaceutical products and factors affecting them • Midterm exam	
Eighth week	• Control of microbial spoilage • Good Manufacture Practice	Determination of temperature exponent
Ninth week	• Preservation of pharmaceutical products and preservatives commonly used • Factors affecting preservative activity Evaluation of preservative's efficacy	• Determination of concentration exponent
Tenth week	• Control of microorganisms by sterilization and survival curve	• Preparation of heat killed vaccine
Eleventh week	• sterilization parameters and sterility assurance	• Determination of phenol-coefficient: Rideal-Walker method • Activity (Report)
Twelfth week	• Methods of sterilization and sterilizers • Applications of sterilization	• Determination of phenol-coefficient: Chick-Martin method
Thirteenth week	• Sterilization of pharmaceutical products	Practical exam
Fourteenth week	• Sterilization control and sterility testing	
Fifteenth week	• Final written exam	•

Teaching and Learning Methods:

- Lectures
- Practical sessions
- Self learning (internet search & report writing)

Student Assessment methods:

Periodical exam **to assess:** a1, c3, c4

Written exams	to assess:	a1, a2, a3, a4, a5, c1, c2, c3, c4, d1
Practical exams	to assess:	b1, b2, c3, b3, c5, d1, d3, d4, d6
Oral exam	to assess:	a1, a2, a3, a4, c1, c2, c3, c4, d1
Activities	to assess:	d2, d5

Assessment schedule:

Assessment (1): Written exams	Midterm exam: Week 7 Final exam: Week 15
Assessment (2): Practical exam	Week 13
Assessment (3): Oral exams	Week 15
Assessment (4): Activity	Week 5,11

Weighting of Assessment:

Assessment method	Marks	Percentage
• Written exam	50	50%
• Practical exam & activity	25	25%
• Oral exam	15	15%
• Midterm exam	10	10%
TOTAL	100	100%

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

List of references:-

- 1- Course Notes: "Notes on Pharmaceutical Microbiology"
- 2- Essential Books (Text Books)
I - Hugo WB and Russell AD "Pharmaceutical Microbiology" 6th edn, Blackwell Scientific Editions; London (1998).
- 3- Recommended Books
"Sterilization, Disinfection and Preservation" 4th edn, Ed Block SS,

Lippincott Williams & Wilkins, London (2001).

"Antibiotics in Laboratory Medicine", 4th edition, Ed Lorian V, Williams and Wilkins, Baltimore (1996).

"Molecular Biotechnology", Pasternak G, ASM press, Washington DC (1994).

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- **Course Coordinator:** Prof. Dr/ Fathy Mohamed El Sayed Serry
 - **Head of Department:** Prof. Dr/ Nehal El-sayed Youssef.

8 تم مناقشة و اعتماد توصيف المقرر من مجلس القسم بتاريخ 201/ 9 / 30

Course Contents					ILOs of Pharmaceutical Microbiology course																
		Knowledge & understanding					Professional and practical skills			Intellectual skills					General and transferable skills						
		a1	a2	a3	a4	a5	b1	b2	b3	c1	c 2	c3	c4	c5	d1	d2	d3	d4	d5	d6	
1. Lectures	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 antisepsis chemical agents used as disinfectant and antiseptic	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				
	9	Control of microorganisms by sterilization and survival curve			X												x				
	10	sterilization parameters and sterility assurance			X		X										x				
	11	Methods of sterilization and sterilizers			X												x				

12	Applications of sterilization			X												x				
13	Sterilization of pharmaceutical products			X		X										x				
14	Sterilization control and sterility testing			X	X	X										x				
Practical sessions																				
1	Laboratory safety measures Bacterial counts & Sterility testing							x	x						x	x	x	x		x
2	Antibiotic susceptibility testing: Kirby-Bauer method								x	x					x	x	x	X		X
3	Demonstration of spectrum of action by strip-plate method Demonstration of interaction between two antimicrobial agents								x	x					x	x	x	X		X
4	Determination of Minimum inhibitory concentration (MIC) by broth dilution								x	x			x		x	x	x	X		X
5	Determination of MIC. by Agar diffusion method								x	x			x		x	x	x	X		X
6	Antibiotic assay								x	x			x		x	x	x	X		X
7	Determination of temperature coefficient								x						x		x	X		X
8	Determination of concentration exponent								x						x		x	X		X
9	Preparation of heat killed vaccine							x							x		x	X		X
10	Determination of phenol-coefficient: Rideal-Walker method							x	x	x					x	x	x	X		X
11	Determination of phenol-coefficient: Chick-Martin method							x	x	x					x	x	x	x		X
	Activity (report)														x	x	x	x	x	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	Midterm exam	Practical exam	Oral exam	Written exam
2.1	Principles of basic, pharmaceutical, medical, social, behavioral, management, health and environmental sciences as well as pharmacy practice	[A2] State the principles of pharmaceutical sciences including pharmaceuticals, pharmacognosy and pharmaceutical chemistry.	a1-a2	Introduction Definition and terminology Antibiotic and chemotherapeutic agents Mechanisms of action of antimicrobial agents	Student book, Essential books	X		X		X	X
				Classification of antimicrobial agents: Antibiotics, Antituberculous, Antileprosy agents, Antifungal, Antiprotozoal & Antiviral drugs							
				Microbial resistance to antimicrobial agents Microbial assay of Antibiotics and vitamins							
				Disinfection and antisepsis Chemical agents used as disinfectant and antiseptic							

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.	[A15] List the different methods of sterilization, sterility testing and their application in microbiological quality control of pharmaceutical products	a3, a4, a5	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	
3.1	Use the proper pharmaceutical and medical terms, abbreviations and symbols in pharmacy practice	[B1] Use effectively the medical and pharmaceutical terminologies, medical abbreviations, idioms, suffixes and prefixes.	b1	All practical sessions	Practical notes		x			x	
							x			x	
							x			x	
							x			x	
3.2	Handle and dispose chemicals and pharmaceutical preparations safely	[B2] Handle and dispose chemical and pharmaceutical materials safely with application of good laboratory practice (GLP) principles.	b2	All practical sessions			x			x	

3.9	Maintain public awareness on rational use of drugs and social health hazards of drug abuse and misuse	[B15] Educate health care professionals and patients regarding rational use of drugs and social health hazards of drug abuse and misuse	b3	practical sessions	Practical notes		X			X		
4.2	Comprehend and apply GLP, GPMP, GSP and GCP guidelines in pharmacy practice	[C2] Comprehend good laboratory practice (GLP), (GPMP), good storing practice (GSP) and good clinical practice (GCP) guidelines in pharmacy practice.	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	X
4.8	Select and	[C9] Select the	c1, c3, c4	Classification of antimicrobial	Student book,	x					x	X

	assess appropriate methods of infection control to prevent infections and promote public health	most appropriate method for infection control. [C10] Employ the knowledge concerning different microbial and parasitic diseases for promotion of community health.		agents: Antituberculous drugs Antileprosy agents Antifungal drugs Antiprotozoal drugs Antiviral drugs Microbial resistance Microbial assay of Antibiotics and vitamins	Essential books							
					Student book, Essential books	x					x	X
4.14	Analyze and evaluate evidence-based information needed in pharmacy practice.	[C16] Apply evidence-based guidelines and professional principles in pharmacy practice with other healthcare professionals.	c5	All practical session	Practical sessions			x		x	x	
5.1	Communicate clearly by verbal and means	D1	d1	All practical session	Practical sessions		x				x	
5.2.	Retrieve and evaluate information from different sources to improve professional competencies	D2	d2	Activity	Internet search			x		x	x	
5.3	Work effectively in a	D4	d3	Activity	Internet search			x		x	x	

	team.											
5.6	Adopt ethical, sales and safety guidelines	D8	d4	Practical sessions	Practical notes		x			x		
5.9	Implement writing and thinking, problem-solving and decision-making abilities	D11	d5	Practical sessions	Internet and Recommended books		x	x		x		
5.10	Implement writing and thinking, problem-solving and decision-making abilities.	D12	d6	Activity	Internet and Recommended books			x		x		

