COURSE SPECIFICATIONS

aculty of Pharmacy

Bachelor of pharmacy(Clinical Pharmacy)

Fourth level – Semester 7

2019-2020

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COURSE SPECIFICATIONS

Medicinal chemistry -1

Fourth level –Semester 7 2019-2020

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: 28/10/2019

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- K	nowledge 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.
	Describe the analytical methods for determination of the
a 4	chemotherapeutic agents.
B- P	rofessional 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- Ir	ntellectual 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-G	eneral 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	-Laboratory safety measures
	to biological action part 1	
2	-Physicochemical properties in relation	Limit test for ablasida
	to biological action part 2	-Limit test for chloride
3	-Antiseptics & disinfectants	-Limit test for sulphate (E.P)
	(alcohol, aldehyde, acids)	
4	-Antiseptics & disinfectants	
	(chlorine containing compounds,	
	phenolic compounds, cationic	-Limit test for sulphate (B.P)
	surfactants, dyes, nitrofurans	
	derivatives, organomercuric compounds & floroquinolones)	
5	& Horoquinolones)	-Limit test for iron
	-Cancer chemotherapy	Zimit test for non
		-Activity (Presentation)
6	-Cancer chemotherapy	Limit test for lead (E.P)
7	Periodical exam	-Practical exam1
8	-Cancer chemotherapy	-Test for heavy metals
9		-Identification of sulpha drugs
	-Sulphonamides	Quantitative estimation of boric
		acid
10		-Identification of organic acids
	-Sulphonamides	and its salts of pharmaceutical use
11		-Quantitative estimation of
	-Antimalaria	hexamine
		-Activity (Internet search)
12	-Antibiotics (B-lactam antibiotics	-Identification of iron, zinc and
	penicillinscephalosporins) &	magnesium salts of
	aminoglycosides	pharmaceutical use
13	-Antibiotics (macrolide , fused ring ,	-Identification of boric acid,
	conjugated polyene compounds, poly	borax, urea and hexamine
	peptide antibiotics)	-Quantitative estimation of
14	*	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): Periodical 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
Periodical 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 2019

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. Mansour Abu. Kull

Head of Department: Prof. Dr. Kamel Metwally

_Date: 28/10/2019 تم مناقشة واعتماد توصيف المقرر من مجلس القسم المقرر بتاريخ بتاريخ

	Matrix	-1	of N	Ied	icinal	cher	nistr	·y-1								
		ILOs of Medicinal chemistry 1 course														
	Course Contents			ledge stanc		-	ession ctical s		ir	ntelle	ctual s	skills			rable al ski	
		a1	a2	a3	a4	b1	b2	b 3	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					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

Nati	ional Academic Reference	Program Course		Course contents	Sources	Teac	hing and le methods	arning	Mo	Methods of assessment				
Sta	andards NARS	ILOs	ILOs	Course contents	Sources	lecture	practical session	self learning	written exam	practi cal exam	oral exam	Periodi cal exam		
	Principles of basic, pharmaceutical			Introduction Physicochemical properties in relation to biological action part 1	Student book, essential books	X			X		X	х		
2.1	, medical, social, behavioral, management, health and environmental sciences as well as pharmacy practice.	A2	a1	Physicochemical properties in relation to biological action part 2	Student book, essential books	X			X		x	x		
2.3	Principles of different analytical	A7	a2	Antibiotics (B-lactam antibiotics penicillinscephalosporins) & aminoglycosides	Student book, essential books	X			x		X			
	techniques using GLP guidelines and validation procedure		a4	Antibiotics (macrolide , fused ring , conjugated polyene compounds , poly peptide antibiotics)	Student book, essential books	X			X		Х			

				Antibiotics (sulphur containing antibiotics , unclassified antibiotics)	Student book, essential books	X	X	x	х	
	D			Antiseptics & disinfectants (alcohol,aldehyde,acids)	Student book, essential books	X		X	х	X
2.4	Principles of isolation, synthesis, purification, identification, and	A8	a3	Antiseptics&disinfectants (chlorine containing compounds, phenolic compounds, cationic surfactants, dyes, nitrofurans derivatives & floroquinolones)	Student book, essential books	X		X	X	X
	standardization methods of pharmaceutical compounds.			Sulphonamides	Student book, essential books	X		X	x	
	compounds.			Antimalaria	Student book, essential books	X		X	X	
				Anticancer	Student book, essential books	X	X	X	x	X
2.1	Methods of biostatistical analysi and	A27	a4	Antibiotics (B-lactam antibiotics penicillinscephalosporins) & aminoglycosides	Student book, essential books	X		X	x	X
7	analysi and pharmaceutical calculation	A21		Antibiotics (macrolide , fused ring , conjugated polyene compounds , poly peptide antibiotics)	Student book, essential	X		X	X	X

	books		ĺ				
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 noteboo k	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 Quantitative estimation of boric acid, hexamine, hydrogen peroxide	practical noteboo k	X		x	
			1.2	limit test for sulphates,chlorides,iron,lead&test for heavy metals	practical noteboo k	X		X	
			b3	Quantitative estimation of boric acid, hexamine, hydrogen peroxide	practical noteboo k	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) 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 of active substancces from different origins.	C5	c2	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	Student book, essential books	X			X	

				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 substancces 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 noteboo k	X		X	

5.8	Demonstrate creativity and time management skills	D10	d3	Quantitative estimation of boric acid, hexamine, hydrogen peroxide	practical noteboo k	X		X	
5.1 0	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. Mansour Abu. Kull Head of Department: Prof. Dr. Kamel Metwally

تم مناقشة واعتماد توصيف المقرر من مجلس القسم المقرر 28/10/2019 تم مناقشة واعتماد توصيف المقرر من مجلس

بتاريخ

COURSE SPECIFICATIONS

Radiopharmaceuticals

Fourth level –Semester 7 2019-2020

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 2019

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- Kno	owledge and Understanding
a1	Illustrate the fundamentals of atomic and nuclear structure as well
aı	as nuclear pharmacy and properties of radiopharmaceuticals.
a2	Describe origin, nature, production of radiation, sources of
u2	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
u i	detection and measurement as well as radiopharmaceutical quality control tests
a5	Summarize compounding, labeling and storage guidelines as well
as	as different equations involved in radiopharmaceutical compounding
B- Pro	fessional and Practical skills
b1	Use properly the terminology commonly used in radiopharmacy
01	practice
C- Inte	llectual skills
c1	Comprehend good laboratory practice and good storing practice of radiopharmaceuticals
c2	Select the appropriate radiopharmaceutical for diagnosis and therapy
D- Gen	neral and Transferable skills
d1	Develop the decision making and problem solving abilities

D- Contents:

Week	Lecture contents (1 hrs/lec.)
No.	
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	Periodical exam
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	Final written exam

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): Periodical exam	Week 7
Assessment (2): Final exam	Week 15

Weighting of Assessment

Assessment method	Marks	Percentage
Periodical 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 pharmaceutics department (2019) 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

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 11 / 2019م

	Matrix	Matrix I of Radiopharmaceuticals Course											
							ILOs of Radio	pharr	naceuticals				
	Course Contents	Knowledge and understanding					Professional and practical skills	Intell	ectual 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				х							
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							
	Quality Control of Radiopharmaceuticals, Radiopharmaceuticals labeling, Storage of					X		
	radiopharmaceuticals radiopharmaceuticals			X				
	Dispensing and distribution of radiopharmaceuticals				X			
13	The basic principles for reduction of radiation doses							
	Precautions to be taken in handling of radiopharmaceuticals							
14	Some calculations involving radiopharmaceuticals			X			X	X

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

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,	A11	a4	Production of Radionuclide: Cyclotron, Reactor, Radionuclide generator	Student book Essential books Student book	x	x	х
	packaging, labeling, storing and distribution processes in pharmaceutical industry.			Principle of radionuclide generator 99m-Tc	Essential books	X	X	
2.9	Principles of hospital pharmacy including I.V. admixtures, TPN and drug distribution	A13	a5	Dispensing and distribution of radiopharmaceuticals	Student book Essential books	X	x	

2.17	Methods of biostatistical analysis and pharmaceutical calculations.	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	Implement writing and thinking, problem- solving	D12	d1	Applications of radiopharmaceuticals in medical diagnosis	Student book Essential books	x	X	x	

	and decision-			Applications of	Student book				
	making abilities		radiopharmaceuticals	Essential	X	X	X		
making dollings.			in therapy	books					

COURSE SPECIFICATIONS

Clinical pharmacy-1

Fourth level –Semester 7 2019-2020

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- l	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- 1	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	Lecture contents (2 hrs/week)	Practical session (1 hrs/week)
No.		
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	Ethics of clinical trials-1
	Mid-term exam	
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-Periodical 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															
		ILOs of the course														
	Course Contents		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	√	√	$\sqrt{}$	√	V				V	V					
2	Fluids and electrolytes	√	1	$\sqrt{}$	1	V				V	V					
3	Fluids and electrolytes	√	1	$\sqrt{}$	V	V				√	V					
4	Fluids and electrolytes		1	1	√					$\sqrt{}$	$\sqrt{}$					
5	Fluids and electrolytes		1	1	√					$\sqrt{}$	$\sqrt{}$					
6	Fluids and electrolytes		1	V	V	V				$\sqrt{}$	V					
7	Clinical trials	√	$\sqrt{}$	$\sqrt{}$	√	V				$\sqrt{}$	V					
8	Clinical trials		1	V	√					$\sqrt{}$	$\sqrt{}$					
9	Clinical trials		1	V	V	V				$\sqrt{}$	V					
10	GIT disease	1	1	V	V	V				V	1					
11	GIT disease	√	1	$\sqrt{}$	V	V			-	√	V					
12	GIT disease	1	1	$\sqrt{}$	V	V				V	1					
13	GIT disease	√	1	$\sqrt{}$	V	V				V	V					
14	Revision	V	1	1	V	V				V	1					

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

	Case studies on			1	,	1		1	1	,
11	gastro-intestinal			V	V	V	$\sqrt{}$	V	V	V
	bleeding									
	Case studies on									
12	inflammatory bowel			$\sqrt{}$			\checkmark	$\sqrt{}$	$\sqrt{}$	$\sqrt{}$
	disease									
13	Practical exam			V	V	V	$\sqrt{}$	$\sqrt{}$	V	V
							V			

Matrix II of Clinical pharmacy 1 course

	tional Academic	Program	Course	Course	Common	Teaching and learning methods			Method of assessment				
Reference Standards (NARS)		ILOs	ILOs	contents	Source	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	V			V		V	√	
	Etiology, epidemiology,	A20	a2	All lectures	Student book Essential books	V			V		V	V	
2.12	laboratory diagnosis and clinical features of different diseases and their pharmacotherapeutic approaches.	A21	a3	All lectures	Student book Essential books	V			V		V	√	

2.14	Principles of clinical pharmacology, pharmacovigilance and the rational use of drugs.	A23	a4	All lectures	Student book Essential books Recommended books	√			√		V	√
2.20	Principles of proper documentation and drug filing systems.	A30	A5	All lectures	Student book Essential books Recommended books	V			V		V	V
3.5	Select medicines based on understanding etiology and path physiology of diseases.	В7	b1	All practical sessions	Practical notes Internet		$\sqrt{}$	V		V		
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		V	V		V		
3.10	Advise patients and other health care professionals about safe and proper use of medicines.	B16	b2	All practical sessions	Practical notes Internet		\checkmark	V		V		

3.12	.12 Employ proper documentation and B18		b3	All practical sessions	Practical notes Internet		V	V		V		
	drug filing systems.	818	b4	All practical sessions	Practical notes Internet		√	V		√		
4.9	Utilize the pharmacological basis of therapeutics in the proper selection and use of drugs in various disease conditions.	C11	cl	All lectures	Student book Essential books Recommended book Internet	V			V		V	√
4.10	Calculate and adjust dosage and dose regimen of medications.	C12	c2	All lectures All practical sessions	Student book Essential books Practical notes	V	V	V	V	V	V	V

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

Course Coordinator: Dr. Islam Ahmed

Head of Department: Prof.Dr. Mona Fouad

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

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 2019

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, parentral 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
	Outline the organization of a hospital pharmacy and the
	responsibilities and duties of pharmacists in the hospital
a1	pharmacy setting
a2	Define hospital formulary, pharmacy & therapeutic committee and rational drug use
	Describe general good dispensing practices of medicines and
a3	for special classes of medicines including narcotics,
as	vaccines, biotechnology products, cytotoxics and
	radiopharmaceuticals
- 4	Illustrate different drug related problems and management
a4	strategies
a5	Outline different pharmaceutical calculations related to
as	preparation of IV admixtures
B- 3	Professional and Practical skills
	Experience different duties of hospital pharmacist including
b 1	prescription interpretation, drug preparation in IV unit and
	drug-drug interaction identification
b2	Handle pharmaceutical preparations safely
L 2	Compound different extemporaneous preparations safely and
b3	effectively
C -	Intellectual skills
_ 1	Differentiate between different medication distribution
c1	systems
c2	Analyze common hazardous situations contributing to

	different medication related problems
	Evaluate different dispensing practices regarding narcotics,
c3	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
u2	solving abilities
d3	Work effectively in a team

D- Contents:

Week	Lecture contents (2 hrs/week)	Practical session (1 hr/week)
No.		
1	- Orientation to hospital pharmacy	Introduction
2	- Introduction to Hospital pharmacy	Translating Medication Orders
	-Responsibilities of hospital pharmacist	
3	- Pharmacy and therapeutic committee	Translating Medication Orders
	- Hospital formulary	
4	- Hospital drug distribution systems	Extemporaneous compounding
5	- Dispensing Process	Extemporaneous compounding
	- Dispensing of biotechnology products	
6	Dispensing of radiopharmaceuticals	Illustration of required activity:
		Items of patient interview
		Illustration of video criteria
7	Dispensing of vaccines	Dry powders for reconstitution
	dispensing of cytotoxics	
	Periodical exam	
8	Dispensing of controlled drugs	Parentral 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	video/presentation
	reactions	viaco/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): Periodical 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
Periodical 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

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

	Matrix I of Hospital pharmacy course														
		ILOs of Hospital pharmacy course													
	Course Contents	knowledge and understanding						ofession of pract skills	ical	Inte	llectual	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														
3	- Hospital formulary		X												
4	Hospital drug distribution systems			X						X					
5	Dispensing Process														
3	Dispensing of biotechnology products	X		Х											
6	Dispensing of radiopharmaceuticals	X		X								X			
7	Dispensing of vaccines											X			
,	Dispensing of cytotoxics	X		Х											
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								x			
11	reactions	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							X				X
3	solving)				X	X				X	X	
4	Parentral 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 &								X			X
,	report writing)					X				X	X	
8	Patient interview & video preparation					X				X	X	X

Matrix II of Hospital pharmacy course

	National Academic					Teach	ing and l methods	U	Wei	ghting o	f asses	ssment
Stan	Reference	Program ILOs	Course ILOs	Course contents	Sources	lecture	practical session	case study/ think- pair- share	written exam	practical exam	oral exam	Periodical exam
2.1	Principles of basic, pharmaceutical, medical, social, behavioral, management, health	A4	al	- Orientation to hospital pharmacy - Introduction to Hospital pharmacy -Responsibilities of hospital pharmacist	Student book Essential books	х			х		х	х
	and environmental sciences as well as pharmacy practice.		a2	Pharmacy and therapeutic committee -Hospital formulary	Student book Essential books	х			х		х	х
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	х			х		х	х

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

3.3	Compound, dispense, label, store and distribute medicines effectively and safely	В3	b3		Practical notes		x	х		x		
4.2	Comprehend and apply GLP, GPMP, GSP and GCP guidelines in pharmacy practice.	C2	c1 c3	Hospital drug distribution systems Dispensing of radiopharmaceutic als, biotechnology products, cytotoxics Dispensing of vaccines Dispensing of controlled drugs	Student book practical notes		x		х		х	х
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		х		x		Х	х
5.1	Communicate clearly by verbal and written means	DI	d1	Translating Medication Orders Extemporaneous compounding Dry powders for reconstitution	Practical notes Recommen ded books Internet	х	х	х			х	

	5.3	Work effectively in a team.	D4	d3	Parentral admixtures Medication errors Drug Interactions Checker			x					
5	5.10	Demonstrate critical thinking, problem- solving and decision-making abilities	D12	d2	Practical Preparation to practice		x	X	x	x	x	x	

Course Coordinator: Dr. Gehan Fathy Attia

Head of Department: Dr. Gehan Fathy Attia

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

COURSE SPECIFICATIONS

Controlled drug delivery systems

Fourth level –Semester 7 2019-2020

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 2019

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- <u>Intended Learning Outcomes of Controlled drug delivery Systems</u> (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- 1	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	Lecture
No.	(2 hrs/week)
1	Basic concepts:
2	-Rational for extended release pharmaceutical -Advantages and disadvantages
	-Terminology & Kinetic mechanism
3	Extended-release technologies for oral dosage forms (Coated
4	Beads, Granules, Microspheres & Microencapsulation
5	techniques)
6	Extended release dosage form (Osmotic pump, Gastro-retentive system & floating system)
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 2019.

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

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Matrix-1 of Controlled drug delivery systems course									
		ILOs of Controlled drug delivery systems							
	Course Contents		knowledge and understanding		intellectual skills		Transferable and general skills		
	Lectures	a1	a2	c1	c2	d1	d2		
1	Basic concepts: -Rational for extended release pharmaceutical -Advantages and disadvantages	X		x			x		
2	-Terminology & Kinetic mechanism								
3 4 5	Extended-release technologies for oral dosage forms (Coated Beads, Granules, Microspheres & Microencapsulation techniques)	x	x	x	x		x		
6	Extended release dosage form (Osmotic pump, Gastro-retentive system & floating system)		x	х	х		x		
7	Periodical exam		X	X	X		X		
8	Mechanism aspects of Oral drug delivery formulation			X					
9	Colloidal Drug Delivery Systems		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		
	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		Program C	Course	Course	Sources	Teaching and learning methods			Weighting of assessment			
S	andards NARS	ILOs	ILOs	contents		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		х	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		х	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	х

			c2	Lectures (3-13)	Student book Essential books			x	х	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

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

COURSE SPECIFICATIONS

Public health & preventive medicine
Fourth level –Semester 7
2019-2020

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 2019

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
	Recognize the basic concepts of public health including epidemiology
a1	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
az	and food supplies, waste disposal, food handling, and housing).
- 2	Illustrate the major topics associated with bioterrorism and nosocomial
a3	infections
a4	Illustrate strategies of health nutrition, family planning, and enumerate
a4	other strategies related to maternal and child health care programs
C - 1	Intellectual skills
c1	Identify different causes of diseases and environmental risk situation
c2	Suggest different strategies for disease prevention
	Analyze epidemiologic data about disease in a population, changes in
c 3	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	Lecture contents (2 hrs/week)
No.	
1	Introduction to public health and epidemiology
1	introduction to public health and epidenhology
2	Environmental health:
	Air pollution
	introduction to Water supply & sanitation
3	Environmental health:
	O Disease transmitted by water
	Controlling waterborne disease
	Purification of water Standard of sofa water supply
4	Standard of safe water supplyFood sanitation
7	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	o Terms used for various forms of outbreaks
	 Classification of infectious diseases
	o Epidemiological Model
	o Periodical exam
8	Specific measurements:
	I. Morbidity rates
	II. Mortality rates
	Problem solving G. 1. D. i. D.
9	Study Designs in Epidemiology
	Epidemiological study methods:
	- Descriptive & Analytical studies: 1. Cohort studies
	2. Case-control studies
10	Nosocomial infections
10	Bioterrorism
11	Immunization and vaccination programs
12	o Family planning & Overpopulation
	o Activity (report)

13	o Revision
14	o 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): Periodical 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%
Periodical 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 :-

Microbiology and Immunology department

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

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

Matrix I of public health &preventive medicine

Course content		Kr	nowledge and	l Understand	ling	In	tellectual sk	ills	Transferable & general skills			
		a1	a2	a3	a4	c1	c2	c3	d1	d2	d3	
1	Introduction to public health & epidemiology	X										
	Environmental health:											
	Air pollution		X			X						
2	introduction to Water supply											
	Disease transmitted by water & controlling of											
	waterborne diseases		x			x				x		
3	Purification of water		A			A .				A .		
3	Standard of safe water supply											
	• Food sanitation											
	o Milk sanitation & Milk- borne disease		X			x						
	o Food poisoning											
4	o measures for safe food											
	Refuse, sewage and Wastes disposal											
5	Hazards of improper Wastes disposal		X			X						
	Sewage treatment Occupational diseases and industrial health											
	Nutrition, malnutrition and nutritional deficiency											
6	diseases				X		X					
	Terms used for various forms of outbreaks											
7	Classification of infectious diseases	X						X				
,	Epidemiological Model	13						1.				
	Specific measurements:											
8	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	o Revision	X	X	X	X	X	X	X			

	NARS	Program ILOs	Course ILOs	Course contents	Sources	lecture	Activity	written exam	oral exam	Periodical exam
2.1	Principles of basic, pharmaceutical, medical, social, behavioral, management, health	A3. Explain the principles of medical sciences including: physiology, histology, anatomy, biochemistry,	al	Introduction to public health & epidemiology Terms used for various forms of outbreaks	Student book Essential books	×		×	×	×
2.1	and environmental sciences as well as pharmacy practice.	pharmacology, therapeutics, parasitology, pathology medical microbiology, immunology and virology.		Specific measurements: I. Morbidity rates II. Mortality rates Problem solving Study Designs in Epidemiology Epidemiological study - Descriptive & Analytical studies	Student book Essential books					
2.10	2.10 Principles of public health issues including sources and control of microbial contamination as well as	[A14] Specify the basics of public health, the art of preventing disease, promoting health, raising public awareness for the safe use and disposal of	a2	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	Student book Essential books	×		×	×	×

	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 o Family planning & Overpopulation Activity (report)	Student book Essential books	×	×	×	×	×
2.	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	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 o Family planning & Overpopulation o 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 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	×	x	×	×

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, problemsolving and decisionmaking 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 2019-2020

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 2019

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) Assignment
4	Production of primary metabolites: alcohols, organic acids, amino acids and polysaccharides	Production of penicillin by fermentation (secondary metabolite) Assignment
5	 Production of secondary metabolites: antibiotics, vitamins, insecticides Production of microbial enzymes 	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 	DNA extraction Assignment
7	<u>Periodical exan</u>	1

8	 Gene cloning and recombinant DNA technology: 	Gel Electrophoresis
0	a- Obtaining target gene b- Selection of cloning vector	<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 Assignment
Eleventh week	Production of human proteins: insulin, interferon, growth hormone, anticoagulants, interleukins	Cloning (horizontal gene transfer) <u>Assignment</u>
Twelfth Week	Chemical synthesis of DNADNA sequencing	<u>Final practical</u> <u>exam -</u>
Thirteenth week	 Applications of recombinant DNA technology: 1- Biomass utilization 	
Fourteent h 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): Periodical 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%
Periodical	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

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

Head of Department: Prof / Nehal Elsayed yousef

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

Matrix 1 of Pharmaceutical Biotechnology course

	Course Contents		and derstanding			Professional and Practical skills		Intel skills	lectua s	1	General and Transferable				lls
		a1	a2	a3	a4	b1	b2	C1	C2	С3	d1	d2	d3	d4	d5
1	Microbial biotechnology and fermentation Practical: lab role	1													
2	 Fermentation system and fermentation processing Practical: Fermentation media 	1	1			1			7						
3	 Production of microbial biomass Practical: Industrial fermentation and production of citric acid (primary metabolite) Assignment 		7			1			1			1			√
4	 Production of primary metabolites: alcohols, organic acids, amino acids and polysaccharides Practical: Production of penicillin by fermentation (secondary metabolite) Assignment 		1	1					1			√			√
5	 Production of secondary metabolites: antibiotics, vitamins, insecticides Production of microbial enzymes Practical: Production of vitamin B12 by fermentation 		√	√				7				√			√

	(secondary metabolite) • Assignment										
	Biotransformation										
	Production of immunological products and their quality control										√
6	Production of bacterial and viral vaccines	1	√	1		√	1		√		
	• Practical : DNA extraction										
	• Assignment										
	Gene cloning and recombinant DNA technology: Obtaining target gene				1						√
7	Practical : Electrophoresis	√	1			√	√		√		4
	Assignment										
	Gene cloning and recombinant DNA technology:				7						
	Selection of cloning vector		,			,	,				√
8	Practical: Polymerase chain reaction	√	1			√	1		√		
	• Assignment										
9	Gene cloning and recombinant DNA technology: c- Making recombinant DNA inserts	1	√		1	1	7		√		√

	• Practical: Cloning									
	• Assignment									
1	 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 	1		7	√	1		√		√
1	Production of human proteins: insulin, interferon, growth hormone, anticoagulants, interleukins	1	1			1				
1	Chemical synthesis of DNADNA sequencing	1								
1	Applications of recombinant DNA technology: Biomass utilization	1	√	1		4				
1	 Applications of recombinant DNA technology: Microbial insecticides and bio-control 	√	√	7		1				

Matrix 2 of Pharmaceutical Biotechnology course

National Academic	ILOs	ILOs		es		eaching learnii metho	ng	Method of assessment					
Reference Standards NARS	Program ILOs	Course	Course contents	Sources	Lecture	Self learning	Practical session	Periodical 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) Introduction of recombinant DNA molecule into a host 	Notebook	V		√	1		√	√		

			 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 						
isolat synth purifi ident stand meth phari	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 utilization, Microbial insecticides and bio-control) 	Notebook	1	V	√	7	√

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	√	٧	√	٧	√
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	1	√	V	√	V
4.5 Select the appropriate methods of	C6] Select the appropriate methods of isolation,	C2	Fermentation system and fermentation processing Production of microbial biomass	Notebook	1	1			

isolation, synthesis, purification, identification, and standardization of active substances from different origins.	synthesis, purification, identification, and standardization of active substances from different origins.		Production of primary metabolites: alcohols, organic acids, amino acids and polysaccharide				√	1	٧
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 host cell and selection of target clone Production of human proteins: insulin, interferon, growth hormone, anticoagulants, interleukins 	Notebook and internet	1	1	√	√	~

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			√		√	1		√	1
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		√	7		√	√	

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		٧			4			
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COURSE SPECIFICATIONS

Pharmaceutical Microbiology

Fourth level –Semester 7 2019-2020

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: 2019/2020

B- Basic information:

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

C- <u>Professional information</u>:

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):

Kn	owledge 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						
Pro	fessional 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						
Into	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						
Ger	neral 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 stripplate 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	Periodical exam

week Eighth week	spoilage of pharmaceutical products and factors affecting them • Periodical exam • 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	Periodical 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%
Periodical 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).

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

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

								IL	Os of Phar	mac	eut	ical 1	Mic	robi	ology	cou	ırse			
	Course Contents	Kno	wledge	e & un	dersta	nding			ional and al skills	Ir	ntell	ectual	skil	ls	Gen	eral a	ınd tr	ansfe	rable s	skills
	1. Lectures	a1	a2	a3	a4	a5	b1	b2	b3	c1	c 2	c3	c4	c5	d1	d2	d3	d4	d5	d6
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			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				
Pra	ctical 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 I of Pharmaceutical Microbiology Course

Matrix II of Pharmaceutical Microbiology Course

	National Academic Reference		Program	Course	Course contents	Sources	Teach	ing and lo	_	Method of assessment				
	St	tandards (NARS)	ILOs	ILOs			Lecture	Practical session	Self learning	Periodical 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 pharmaceutics, pharmacognosy and pharmaceutical chemistry.	a1-a2	Introduction Definition and terminology Antibiotic and chemotherapeutic agents Mechanisms of action of antimicrobial agents 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	Student book, Essential books	X			X		x	X	

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			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	Practical notes		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	Student book,	X				X	X

	assess appropriate	most appropriate method for		antimicrobial agents: Antituberculous drugs	Essential books						
	methods of infection control to prevent infections and promote public health	infection control. [C10] Employ the knowledge concerning different microbial and parasitic diseases for promotion of community health.		Antileprosy agents Antifungal drugs Antiprotozoal drugs Antiviral drugs Microbial resistance Microbial assay of Antibiotics and vitamins	Student book, Essential books	X				х	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	х	х	х	
5.10	Implement writing and thinking, problem- solving and decision- making abilities.	D12	d6	Activity	Internet and Recommended books		х	х	