

COURSE SPECIFICATIONS

Faculty of Pharmacy

Fourth Year – First Term

2019-2020

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**COURSE
SPECIFICATIONS**

Phytochemistry-2

**Fourth year – first Term
2019-2020**

Course Specification of Phytochemistry II

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

A- Course specifications:

Program(s) on which the course is given: Bachelor of Pharmacy
Major or Minor element of programs: Major
Department offering the program: -----
Department offering the course: Pharmacognosy
Academic year/Level: Fourth year / semester 7
Date of specification approval: 30 /09/2019

B- Basic information:

Title: Phytochemistry II Code: PG415
Credit Hours: ---
Lectures: 2 hrs
Practical: 2 hrs
Tutorials: ---
Total: 3 hrs

C- Professional information:

1-Overall Aims of the Course:

On completion of the course, the student will be able to:
Demonstrate comprehensive knowledge, clear understanding and the competent skills in dealing with alkaloids and volatile oils.

2-Intended Learning Outcomes of Phytochemistry II

A- Knowledge and Understanding	
a1	Define, state and classify certain classes of natural products (alkaloids, volatile oils), their physical properties and biosynthetic pathways.
a2	Describe the chemistry of the above mentioned classes, their pharmacological properties (biological activities) and contra-indications.
a3	Identify different analytical techniques used in natural products determination for the above mentioned classes, their methods of isolation, purification and identification.
a4	Identify natural and pharmaceutical products containing alkaloids and volatile oils.
a5	Recognize volatile oils as a type of alternative medicine (aromatherapy).
B- Professional and Practical skills	
b1	Handle chemicals, solvents and equipment safely.
b2	Examine different alkaloids and volatile oils.
b3	Prepare a lab research report on alkaloids and volatile oils analysis.
C- Intellectual skills	
c1	Choose the proper pharmaceutical terms and abbreviations for certain classes of natural (alkaloids, volatile oils).
c2	Estimate certain classes of naturally occurring products (alkaloids, volatile oils).
c3	Predict the appropriate method for isolation and purification of different alkaloids, volatile oils.
D- General and Transferable skills	
d1	Work effectively as a member of a team.
d2	Manage time to achieve targets within deadlines.
d3	Write and present reports.
d4	Develop critical thinking and problem-solving skills.

D- Contents:

Week No.	Lecture (2hrs/week)	Practical session (2hrs/week)
1	Alkaloids Classification, isolation and properties	General alkaloids chemical tests and isolation
2	Alkaloids Biosynthesis of alkaloids	Chemical tests for ephedrine and caffeine.
3	Alkaloids Non-heterocyclic, pyridine and piperidine alkaloids	(Activity) Get a copy of pamphlets for pharmaceutical products containing alkaloids
4	Alkaloids Tropane alkaloids	Chemical tests for brucine, quinine and papaverine.
5	Alkaloids Quinoline and isoquinoline alkaloids	Chemical tests for strychnine and atropine.
6	Alkaloids Indolic and terpenoid alkaloids	(Activity) Get a copy of pamphlets for pharmaceutical products containing alkaloids
7	Midterm written exam	
8	Alkaloids Xanthine and imidazole alkaloids	Preparation of volatile oils. Determination of purity of volatile oils
9	Volatile oils - Occurrence, physical properties. - Preparation and determination. - Chemistry and uses. - Classification of vol. oils components.	Chemical tests for identification of volatile oils (Activity) Get a copy of pamphlets for pharmaceutical products containing volatile oils
10	-Biosynthesis of volatile oils	Assay of benzaldehyde.
11	Volatile oils	Assay of Eugenol in clove

	Hydrocarbons. Oxygenated components.	oil. Assay of Cineol in Eucalyptus oil.
12	Volatile oils Oxygenated components. N and S containing components.	Practical exam 1
13	Volatile oils N and S containing components.	Practical exam 2
14	Revision.	
15	Written exam	

E- Teaching and Learning Methods:

- Lectures.
- Interactive lectures.
- Practical sessions.
- Videos.
- Self-learning (group discussion, net search).
- Visits to community pharmacy to get copy of pamphlets for pharmaceutical products containing studied natural products.

F- Student Assessment Methods:

- 1- Written exam (midterm, final) to assess a1, a2, a3, a4, a5, c1, c2, c3 and d4.
- 2- Activity to assess b3, c1, c2, c3, d1, d2, d3 and d4.
- 3- Practical exam to assess b1, b2, b3.
- 4- Oral exam to assess a1, a2, a3, a4, a5, c1, c2, c3 and d4.

Assessment schedule:

Assessment (1): Midterm written exam	Week 7
Assessment (2): Activity	Weeks 3, 6, 9
Assessment (3): Practical exam	Weeks 12, 13
Assessment (4): Final written exam	Week 15
Assessment (5): Oral exams	Week 15

Weighting of Assessment:

Assessment method	Marks	Percentage
Midterm written exam	10	10%
Activity	5	5%
Practical exam	20	20%
Final written exam	50	50%
Oral exam	15	15%
TOTAL	100	100%

G- Facilities Required for Teaching and Learning:

- Black (white) board, Data show, Laboratory equipment (water bath, polarimeter, melting point apparatus, digital balances and glassware) and Chemicals.

H- List of References:

1- Course Notes:

Student book of Phytochemistry II approved by Pharmacognosy Department (2019).

2- Essential books:

Nakanishi, K., Goto, T., & Itô, S. (Eds.). (2013). *Natural products chemistry* (Vol. 1). Academic press.

Dewick, P. M. (2002). *Medicinal natural products: a biosynthetic approach*. John Wiley & Sons.

Colegate, S. M., & Molyneux, R. J. (Eds.). (2007). *Bioactive natural products: detection, isolation, and structural determination*. CRC press.

3- Recommended books:

Rahman, A. U. (2012). *Studies in natural products chemistry/edited by Atta-ur-Rahman*. Amsterdam; New York: Elsevier.

4- Periodicals and websites:

Fitoterapia, Die Pharmazie, Journal of Natural Products, Phytochemistry and Planta medica

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

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

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

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

Course Coordinator: Prof Dr. Mahmoud AbdAlaal

Head of Department: Prof Dr. Amal AlGendi

Date: 30 سبتمبر 2019 تم مناقشة و اعتماد توصيف المقرر من مجلس القسم بتاريخ

Matrix I of Phytochemistry II course

Course Contents		ILOs of Phytochemistry II course														
		Knowledge and understanding					Professional and practical skills			Intellectual skills			General and transferable skills			
		a1	a2	a3	a4	a5	b1	b2	b3	c1	c2	c3	d1	d2	d3	d4
Lectures		a1	a2	a3	a4	a5	b1	b2	b3	c1	c2	c3	d1	d2	d3	d4
1	Alkaloids Classification, isolation and properties	x								x		x				
2	Alkaloids Biosynthesis of alkaloids	x														
3	Alkaloids Non-heterocyclic, pyridine and piperidine alkaloids		x	x	x					x	x	x				
4	Alkaloids Tropane alkaloids		x	x	x					x	x	x				
5	Alkaloids Quinoline and isoquinoline alkaloids		x	x	x					X	x	x				
6	Alkaloids Indolic and terpenoid alkaloids		x	x	x					x	x	x				
7	Alkaloids Xanthine and imidazole alkaloids		x	x	x					x	x	x				
8	Volatile oils - Occurrence, physical properties. - Preparation and determination.	x	x	x	x					x	x	x				

	- Chemistry and uses. - Classification of vol. oils components.																		
9	-Biosynthesis of volatile oils	x																	
10	Volatile oils Hydrocarbons. Oxygenated components.		x	x	x	x					x	x	x						
11	Volatile oils Oxygenated components.		x	x	x	x					x	x	x						
12	Volatile oils N and S containing components.		x	x	x	x					x	x	x						
Practical sessions																			
13	General alkaloids chemical tests and isolation							x	x	x					x				x
14	Chemical tests for ephedrine and caffeine.							x	x	x									x
15	Alkaloids in pharmaceutical products (activity).							x	x	x	x	x			x	x		x	x
16	Chemical tests for brucine, quinine and papaverine.							x	x	x									x
17	Chemical tests for strychnine and atropine.							x	x	x									x
18	Alkaloids in pharmaceutical products (activity).							x	x	x	x	x			x	x		x	x
19	Preparation of volatile oils. Determination of purity of volatile oils							x	x	x					x				x
20	Chemical tests for identification of volatile oils Volatile oils in pharmaceutical products (activity).							x	x	x	x	x			x	x		x	x
21	Assay of benzaldehyde							x	x	x									x
22	Assay of Eugenol in clove oil. Assay of Cineol in Eucalyptus oil.							x	x	x									x

Matrix II of Phytochemistry II course

National Academic Reference Standards (NARS)	Program ILOs	Course ILOs	Course contents	Sources	Teaching and learning methods			Method of assessment				
					Lecture/interactive lecture/videos	Practical session/videos	Self learning	Written exam	Practical exam	Oral exam	Activity	
			Theoretical sessions									
2.4 4.5	Principles of isolation, synthesis, purification, identification, and standardization methods of pharmaceutical compounds. Select the appropriate methods of isolation, synthesis, purification, identification, and standardization of active substances from different origins.	A12, C9	a1, c1, c3 Alkaloids Classification, isolation and properties	Student book Essential books	x			x			x	
2.4	Principles of isolation, synthesis, purification, identification, and standardization methods of pharmaceutical compounds.	A12	a1, Alkaloids Biosynthesis of alkaloids	Essential books Internet	x		x	x			x	
2.13, 4.5	Pharmacological properties of drugs including mechanisms of action, therapeutic uses, dosage, contraindications, ADRs and drug interactions. Select the appropriate methods of isolation, synthesis, purification, identification, and standardization of active substances from different origins.	A30, C9	a2, a3, a4, c1, c2, c3 Alkaloids Non-heterocyclic, pyridine and piperidine alkaloids	Student book Essential books Internet	x			x			x	
2.13, 4.5	Pharmacological properties of drugs including mechanisms of action, therapeutic uses, dosage, contraindications, ADRs and drug interactions. Select the appropriate methods of isolation, synthesis, purification,	A30, C9	a2, a3, a4, Alkaloids Tropane alkaloids	Student book Essential books Internet	x			x			x	

	identification, and standardization of active substances from different origins.		c1, c2, c3									
2.13, 4.5	Pharmacological properties of drugs including mechanisms of action, therapeutic uses, dosage, contra-indications, ADRs and drug interactions. Select the appropriate methods of isolation, synthesis, purification, identification, and standardization of active substances from different origins.	A30, C9	a2, a3, a4, c1, c2, c3	Alkaloids Quinoline and isoquinoline alkaloids	Student book Essential books Internet	x				x		x
2.4 2.13, 4.5	Principles of isolation, synthesis, purification, identification, and standardization methods of pharmaceutical compounds. Pharmacological properties of drugs including mechanisms of action, therapeutic uses, dosage, contra-indications, ADRs and drug interactions. Select the appropriate methods of isolation, synthesis, purification, identification, and standardization of active substances from different origins.	A12, A30, C9	a1, a2, a3, a4, c1, c2, c3	Alkaloids Indolic and terpenoid alkaloids	Student book Essential books Internet	x				x		x
2.4 2.13, 4.5	Principles of isolation, synthesis, purification, identification, and standardization methods of pharmaceutical compounds. Pharmacological properties of drugs including mechanisms of action, therapeutic uses, dosage, contra-indications, ADRs and drug interactions. Select the appropriate methods of isolation, synthesis, purification, identification, and standardization of active substances from different origins.	A12, A30, C9	a1, a2, a3, a4, c1, c2, c3	Alkaloids Xanthine and imidazole alkaloids	Student book Essential books Internet	x				x		x

2.13, 4.5	Pharmacological properties of drugs including mechanisms of action, therapeutic uses, dosage, contraindications, ADRs and drug interactions. Select the appropriate methods of isolation, synthesis, purification, identification, and standardization of active substances from different origins.	A30, C9	a2, a3, a4, a5, c1, c2, c3	Volatile oils - Occurrence, physical properties. - Preparation and determination. - Chemistry and uses. - Classification of vol. oils components.	Student book Essential books Internet	x				x			x	
2.4	Principles of isolation, synthesis, purification, identification, and standardization methods of pharmaceutical compounds.	A12	a1	-Biosynthesis of volatile oils	Student book Essential books Internet	x				x			x	
2.4 2.13, 4.5	Principles of isolation, synthesis, purification, identification, and standardization methods of pharmaceutical compounds. Pharmacological properties of drugs including mechanisms of action, therapeutic uses, dosage, contraindications, ADRs and drug interactions. Select the appropriate methods of isolation, synthesis, purification, identification, and standardization of active substances from different origins.	A12, A30, C9	a1, a2, a3, a4, a5, c1, c2, c3	Volatile oils Hydrocarbons. Oxygenated components.	Student book Essential books Internet	x				x			x	
2.4 2.13, 4.5	Principles of isolation, synthesis, purification, identification, and standardization methods of pharmaceutical compounds. Pharmacological properties of drugs including mechanisms of action, therapeutic uses, dosage, contraindications, ADRs and drug interactions. Select the appropriate methods of isolation, synthesis, purification,	A12, A30, C9	a1, a2, a3, a4, a5, c1,	Volatile oils Oxygenated components.	Student book Essential books Internet	x				x			x	

	identification, and standardization of active substances from different origins.		c2, c3									
2.4 2.13, 4.5	Principles of isolation, synthesis, purification, identification, and standardization methods of pharmaceutical compounds. Pharmacological properties of drugs including mechanisms of action, therapeutic uses, dosage, contra-indications, ADRs and drug interactions. Select the appropriate methods of isolation, synthesis, purification, identification, and standardization of active substances from different origins.	A12, A30, C9	a1, a2, a3, a4, a5, c1, c2, c3	Volatile oils N and S containing components.	Student book Essential books Internet	x			x			x
				Practical sessions								
3.2 3.11, 4.5 5.9,	Handle chemicals and pharmaceutical products effectively and safely with respect to relevant laws and legislations. Conduct research studies and analyze the results. Select the appropriate methods of isolation, synthesis, purification, identification, and standardization of active substances from different origins. Implement writing and presentation skills.	B2, B19, C9, D10	b1, b2, b3, c3, d3	General alkaloids chemical tests and isolation	Practical notes		x			x		
3.2 3.4, 3.11, 4.5 5.9,	Handle chemicals and pharmaceutical products effectively and safely with respect to relevant laws and legislations. Extract, isolate, synthesize, purify, identify, and /or standardize active substances from different origins. Conduct research studies and analyze the results. Select the appropriate methods of isolation, synthesis, purification, identification, and standardization of active substances from different origins. Implement writing and presentation skills.	B2, B6, B19, C9, D10	b1, b2, b3, c1, c2, d3	Chemical tests for ephedrine and caffeine.	Practical notes		x			x		

3.2 3.4, 3.11, 4.2, 4.5, 5.2, 5.3, 5.4, 5.9, 5.10	Handle chemicals and pharmaceutical products effectively and safely with respect to relevant laws and legislations. Extract, isolate, synthesize, purify, identify, and /or standardize active substances from different origins. Conduct research studies and analyze the results Comprehend and apply GLP, GPMP, GSP and GCP guidelines in pharmacy practice. Select the appropriate methods of isolation, synthesis, purification, identification, and standardization of active substances from different origins. Retrieve and evaluate information from different sources to improve professional competencies. Work effectively in a team. Use numeracy, calculation and statistical methods as well as information technology tools. Implement writing and presentation skills. Implement writing and thinking, problem-solving and decision- making abilities.	B2, B6, B19, C3, C9, D2, D3, D4, D10, D11	b1, b2, b3, c1, c2, c3, d1, d2, d3, d4	Alkaloids in pharmaceutical products (activity).	Practical notes Internet Visits for community pharmacies	x	x	x	x
3.2 3.4, 3.11, 4.5 5.9,	Handle chemicals and pharmaceutical products effectively and safely with respect to relevant laws and legislations. Extract, isolate, synthesize, purify, identify, and /or standardize active substances from different origins. Conduct research studies and analyze the results Select the appropriate methods of isolation, synthesis, purification, identification, and standardization of active substances from different origins. Implement writing and presentation skills.	B2, B6, B19, C9, D10	b1, b2, b3, c1, c2, d3	Chemical tests for brucine, quinine and papaverine.	Practical notes	x		x	

3.2 3.4, 3.11, 4.2, 4.5, 5.2, 5.3, 5.4, 5.9, 5.10	Handle chemicals and pharmaceutical products effectively and safely with respect to relevant laws and legislations. Extract, isolate, synthesize, purify, identify, and /or standardize active substances from different origins. Conduct research studies and analyze the results Comprehend and apply GLP, GPMP, GSP and GCP guidelines in pharmacy practice. Select the appropriate methods of isolation, synthesis, purification, identification, and standardization of active substances from different origins. Retrieve and evaluate information from different sources to improve professional competencies. Work effectively in a team. Use numeracy, calculation and statistical methods as well as information technology tools. Implement writing and presentation skills. Implement writing and thinking, problem-solving and decision- making abilities.	B2, B6, B19, C3, C9, D2, D3, D4, D10, D11	b1, b2, b3, c1, c2, c3, d1, d2, d3, d4	Chemical tests for ergometrine, strychnine and atropine. Alkaloids in pharmaceutical products (activity).	Practical notes Internet Visits for community pharmacies	x	x	x	x
3.2 3.11, 4.5 5.9,	Handle chemicals and pharmaceutical products effectively and safely with respect to relevant laws and legislations. Conduct research studies and analyze the results Select the appropriate methods of isolation, synthesis, purification, identification, and standardization of active substances from different origins. Implement writing and presentation skills.	B2, B19, C9, D10	b1, b2, b3, c3, d3	Preparation of volatile oils. Determination of purity of volatile oils	Practical notes	x		x	
3.2 3.4, 3.11, 4.2, 4.5,	Handle chemicals and pharmaceutical products effectively and safely with respect to relevant laws and legislations. Extract, isolate, synthesize, purify, identify, and /or standardize active substances from different origins. Conduct research studies and analyze the results Comprehend and apply GLP, GPMP,	B2, B6, B19, C3, C9,	b1, b2, b3, c1, c2,	Chemical tests for identification of volatile oils Volatile oils in pharmaceutical products	Practical notes Internet Visits for community	x	x	x	x

5.2, 5.3, 5.4, 5.9, 5.10	GSP and GCP guidelines in pharmacy practice. Select the appropriate methods of isolation, synthesis, purification, identification, and standardization of active substances from different origins. Retrieve and evaluate information from different sources to improve professional competencies. Work effectively in a team. Use numeracy, calculation and statistical methods as well as information technology tools. Implement writing and presentation skills. Implement writing and thinking, problem-solving and decision- making abilities.	D2, D3, D4, D10, D11	c3, d1, d2, d3, d4	(activity).	pharmacies							
3.2 3.4, 3.11, 4.5 5.9,	Handle chemicals and pharmaceutical products effectively and safely with respect to relevant laws and legislations. Extract, isolate, synthesize, purify, identify, and /or standardize active substances from different origins. Conduct research studies and analyze the results Implement writing and presentation skills.	B2, B6, B19, D10	b1, b2, b3, d3	Assay of Benzaldehyde	Practical notes		x				x	
3.2 3.4, 3.11, 4.5 5.9,	Handle chemicals and pharmaceutical products effectively and safely with respect to relevant laws and legislations. Extract, isolate, synthesize, purify, identify, and /or standardize active substances from different origins. Conduct research studies and analyze the results Implement writing and presentation skills.	B2, B6, B19, D10	b1, b2, b3, d3	Assay of Eugenol in clove oil. Assay of Cineol in Eucalyptus oil.	Practical notes		x				x	

Course Coordinator: Prof Dr. Mahmoud AbdAlaal

Head of Department: Prof Dr. Amal AlGendi

Date: 30 سبتمبر 2019 تم مناقشة و اعتماد توصيف المقرر من مجلس القسم بتاريخ

**COURSE
SPECIFICATIONS**

Clinical Biochemistry-1

**Fourth year – first Term
2019-2020**

Course Specification of Clinical Biochemistry I

University: Zagazig **Faculty:** Pharmacy

A- Course specifications:

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

Major or Minor element of programs: Major

Department offering the program: -----

Department offering the course: Biochemistry department

Academic year/Level: Fourth year/First term

Date of specification approval: Sept. 2019

B- Basic information:

Title: Clinical Biochemistry I Code: BC 412

Lectures : 2 hrs/week

Practical: 2 hrs/week

Tutorials: ---

Total: 3 hrs/week

C- Professional information:

1-Overall Aims of the Course:

On completion of the course, students will be able to discuss disorders of metabolism, their clinical features and diagnosis.

2-Intended Learning Outcomes of Clinical Biochemistry (ILOs):

A- Knowledge and Understanding	
a1	Identify different clinical biochemistry terms, principle and their significance in clinical practice.
a2	Outline disorders of carbohydrates, lipids and protein metabolism.
a3	Recognize different inflammatory markers and their diagnostic value.
a4	Illustrate etiology and clinical features of endocrine system.
a5	Mention different markers of tumor markers.
a6	Distinguish clinical biochemistry in pediatrics and geriatrics.
B- Professional and Practical skills	
b1	Handle chemicals and biological samples safely.
b2	Perform laboratory tests to identify various diseases.
C- Intellectual skills	
c1	Apply good laboratory practice in pharmacy practice.
c2	Assess different analytical methods used for different metabolites and biological samples.
c3	Analyze and interpret quantitative data in a suitable form.
c4	Integrate scientific information from different sources in clinical biochemistry practice.
D- General and Transferable skills	
d1	Develop both written and oral communication.
d2	Evaluate information from different sources to improve professional abilities.
d3	Work effectively as a member of a team.
d4	Write reports and present it.
d5	Develop critical thinking and problem solving abilities.

D- Contents:

Week No.	Lecture (2hrs/week)	Practical session (2 hrs/week)
1	• Introduction to clinical biochemistry.	• Lab safety rules & molecular techniques employed in studying DNA genes.
2	• Proteins and proteins of inflammation and the immune system.	
3		
4	• Cancer biology and tumor markers	• Carbohydrates metabolism disorders + case study
5		• Protein metabolism disorders + albumin assay
6	• Disorder of carbohydrate metabolism	
7	• Midterm	• Lipid metabolism disorder + case study
8	• Disorders of lipid metabolism	
9	• Disorders of endocrine system	• Practical exam 1 (case +sheet)
10		• Practical exam 2 + presentation
11		
12	• Clinical biochemistry in pediatrics and geriatrics.	
13		
14	- Revision & Open discussion	
15	Final exam	

E- Teaching and Learning Methods:

- Lectures
- Practical sessions
- Case study

- Self learning on different topics followed by report writing and presentation

F- Student Assessment Methods:

- 1- Written exam to assess a1, a2, a3, a4, a5, a6, c4
- 2- Activity to assess d1, d2, d3, d4, d5
- 3- Practical exam to assess b1, b2, b3, c1, c2, c3, d1, d2, d3, d4, d5
- 4- Oral exam to assess a1, a2, a3, a3, a4, a5, a6, c4, d5

Assessment schedule:

Assessment (1): Midterm	Week 7
Assessment (2): Final exam	Week 15
Assessment (3): Oral exam	Week 15
Assessment (4): Practical exam 1	Week 9
Assessment (5): Practical exam 2	Week 10

Weighting of Assessment:

Assessment method	Marks	Percentage
Written exam	50	50%
Midterm	10	10%
Practical exam	20	20%
Activity	5	5%
Oral exam	15	15%
TOTAL	100	100%

G- Facilities Required for Teaching and Learning:

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

H- List of References:

- 1- **Course Notes:** Student book of Clinical Biochemistry I approved by biochemistry department 2019-2020
- Practical notes of Clinical Biochemistry I approved by biochemistry department 2019 -2020.

2- Essential books:

i- Clinical biochemistry: An illustrated colour text book (fourth edition);
Murphy M.J., Cowan R.A., O'Reilly D. St. J., Stewart M.J, Shepherd J.;
Churchil Livingstone Elsevier (2008).

ii- Text book of Biochemistry with clinical correlations (fifth edition);
Devlin T.M.; A John Willey & Sons Inc. (2002).

iii- Medical Biochemistry (third edition); Baynes J.W., Domoiniczak
M.H.; Mosby Elsevier (2009).

3- Recommended books:

i- Lippincott's Illustrated Review Biochemistry (fifth edition); Ferrier
D.R., Harvey R.A.; Lippincott Williams & Wilkins (2010).

ii- Tietz Fundamentals of Clinical Chemistry Fundamentals (fifth edition)
; Burtis C.A., Ashwood E.R.; W.B. Saunders company (2005).

iii- Essentials of medical biochemistry with clinical cases;
Bahagavan N.V, Chung-Eun Ha; Elsevier Inc. (2011).

4- Periodicals and websites:

<https://labtestsonline.org>

Indian J. of Clinical Biochemistry

Egyptian J. of biochem. and molecular biology.

Annals of Clinical Biochemistry

Arab J. of Laboratory Medicine,

J. of Cardiovascular diseases.

www.Pubmed.Com

www.sciencedirect.com.

Course Coordinators:

Head of department:

D

Matrix I of Clinical biochemistry I course																		
Course Contents		ILOs of clinical biochemistry I course																
		Knowledge and understanding						Professional and practical skills		Intellectual skills				General and transferable skills				
Lectures		a1	a2	a3	a4	a5	a6	b1	b2	c1	c2	c3	c4	d1	d2	d3	d4	d5
1	Introduction to clinical biochemistry	x																
2	Proteins and proteins of inflammation and the immune system.			x														
3				x														
4	Cancer biology and tumor markers						X					x	x					
5							X											
6	Disorder of carbohydrate metabolism		x															
7	Midterm																	
8	Disorders of lipid metabolism		x									x	x					
9	Disorders of endocrine system				X	X												
10					x	X						x	x					
11					x	X												
12	Clinical biochemistry in pediatrics and geriatrics						x											
13							x											x
14	Revision and open discussion																	
Practical sessions																		
1	Lab safety rules & molecular techniques							x	x		x		x					

2	employed in studying DNA genes.								x	x	x	x						
3	Carbohydrates metabolism disorders + case study								x	x	x	x						
4									x	x	x	x						
5	Protein metabolism disorders + albumin assay							x	x	x	x	x						
6								x	x			x		x		x	x	x
7	Lipid metabolism disorder + case study								x			x		x				x
8									x			x		x				x
9	Practical exam 1												x		x	x		
10	Practical exam 2							X	x	x	x	x	x	x	x	x	x	x

Matrix II of Clinical biochemistry I course

National Academic Reference Standards (NARS)		Program ILOs	Course ILOs	Course contents	Sources	Teaching and learning methods			Method of assessment			
						Lecture	Practical session	Self learning	Written exam	Practical exam	Periodical exam	Oral exam
2.1	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.	A4	a1	Identify different clinical biochemistry terms and principle and their significance in clinical practice.	Student book Essential books	X			x		x	X
			a2	Outline disorders of carbohydrates, lipids and protein metabolism.	Student book Essential books	X			x		x	X
2.11		A25	a3	Recognize different inflammatory markers and their diagnostic value.	Student book Essential books	X			x		x	X

2.12	Etiology, epidemiology, laboratory diagnosis and clinical features of different diseases and their pharmacotherapeutic approaches	A27	a4	Illustrate etiology and clinical features of endocrine system and bone diseases.	Student book Essential books	X			x			X	
		A28	a5	Mention different markers of tumor markers.	Student book Essential books	X			x			X	
			a6	Distinguish clinical biochemistry in pediatrics and geriatrics.	Student book Essential books	x			x			X	
3.2	Handle and dispose chemicals and pharmaceutical preparations safely	B2	b1	Lab safety rules & molecular techniques employed in studying DNA genes.	Practical notes		x				x		
3.6	Monitor and control microbial growth and carry out laboratory tests for identification of Infectious and non- infections in biological specimens.	B11	b2	Protein metabolism disorders + albumin assay	Practical notes		x					x	

4.2	Comprehend and apply GLP, GPMP, GSP and GCP guidelines in pharmacy practice	C3	c1	Lab safety rules & molecular techniques employed in studying DNA genes.	Practical notes		x			x		
4.7	Apply various principles to determine the characteristics of biopharmaceutical products.	C12	c2	molecular techniques employed in studying DNA genes.	Practical notes		x			x		

4.13	Analyze and interpret experimental results as well as published literature	C18	c3	Protein metabolism disorders + albumin assay Carbohydrates metabolism disorders + case study Lipid metabolism disorder + case study	Practical notes	x			x			
4.14	Analyze and evaluate evidence-based information needed in pharmacy practice	C19	c4	Cancer biology and tumor markers. Disorders of lipid metabolism. Disorders of endocrine system.	Student book, essential books	X		x		x	X	

5.1	Communicate clearly by verbal and written means	D1	d1	<p>Lab safety rules & molecular techniques employed in studying DNA genes.</p> <p>Protein metabolism disorders + albumin assay</p> <p>Carbohydrates metabolism disorders + case study</p> <p>Lipid metabolism disorder + case study</p>	<p>Practical notes</p> <p>Recommended books</p> <p>Internet</p>		x	x		x		
5.2	Retrieve and evaluate information from different sources to improve professional competencies	D2	d2	Activity (Case study- Report)	<p>Recommended books</p> <p>Internet</p>		x	x		x		
5.3	Work effectively in a team	D3	d3	Activity (Case study- Report)	<p>Recommended books</p> <p>Internet</p>		x	x		x		

5.9	Implement writing and presentation skills	D10	d4	Activity (Case study- Report)	Recommended books Internet		x	x		x		
5.10	Implement writing and thinking, problem- solving and decision-making abilities.	D11	d5	Revision- open discussion	Student book Essential books Recommended books Internet	X		x				x
				Activity (Case study- Report)	Recommended books Internet		x	x		x		



**COURSE
SPECIFICATIONS**

Bioassay -1

**Fourth year – first Term
2019-2020**

Course Specification of Bioassay-1

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

A- Course specifications:

Program(s) on which the course is given: Bachelor of Pharmacy
Major or Minor element of programs: Major
Department offering the program: -----
Department offering the course: Pharmacology & Toxicology
Department
Academic year/Level: Fourth year /First term
Date of specification approval: October 2019

B- Basic information:

Title: Bioassay (1) Code: **PT 414**
Credit Hours: ---
Lectures: 2 hrs/week
Practical: 2 hrs/week
Tutorials: ---
Total: 3 hrs/week

C- Professional information:

1-Overall Aims of the Course:

1. On completion of the course, the student will be able to:
2. Explain the basic principles of biostatistics.
3. Choose and apply the proper statistical tests for evaluation of experimental results.
4. Explain recent methods of biological screening and standardization of drugs.
5. Illustrate animal behavioral assays and their applications.
6. Describe processes of drug approval.
7. Identify how clinical trials are designed.

2-Intended Learning Outcomes of Bioassay-1 course

A- Knowledge and Understanding	
a1	Mention the basic principles and methods of biostatistics
a2	Outline different types of biological assay of pharmaceutical compounds
a3	Illustrate the process of drug approval process & design of clinical trials
B- Professional and Practical skills	
b1	Perform statistical analysis of experimental results using suitable statistical methods
b2	Handle tools (devices & computers) used in bioassay labs in a professional & safe way
b3	Construct proper research methodology and analyse the results
b4	Use the appropriate method for screening and standardization of bioactive compounds
C- Intellectual skills	
c1	Compare experimental results and deduce probable statistical significance of any observed changes
c2	Select suitable laboratory techniques for biological assay of drugs
D- General and Transferable skills	
d1	Work effectively as a member of a team.
d2	Manage time to achieve targets within deadlines.
d3	Use computer-based statistical methods and internet communication
d4	Write and present reports.

D- Contents:

Week No.	Lecture (2hrs/week)	Practical session (2hrs/week)
1	Biostatistics: Introduction	Biostatistics
2	Biostatistics: Descriptive statistics	Biostatistics
3	Biostatistics: Theoretical probability distributions	Biostatistics
4	Biostatistics: Hypothesis testing	Biostatistics
5	Biostatistics: Applications	Biostatistics (Activity Report)
6	Biostatistics: Applications	Biostatistics (Activity Report)
7	Periodic Exam	Periodic Exam
8	Pharmacological screening and standardization	Animal behavioural tests
9	Animal bioassays	Animal behavioural tests
10	Animal bioassays	Animal behavioural tests
11	Drug Approval processes	Animal behavioural tests
12	Design of clinical studies	Practical exam
13	Design of clinical studies	Practical exam
14	Revision	
15	Final written exam	

E- Teaching and Learning Methods:

- Lectures (include videos).
- Practical sessions (include videos).
- Self-learning (group assignment)

F- Student Assessment Methods:

- 1- Written exam (periodic, final) to assess a1, a2, a3, c1, c2.
- 2- Activity (group assignment) to assess skills like: d1,d2,d3, d4.
- 3- Practical exam to assess b1, b2, b3, b4
- 4- Oral exam to assess a1, a2, a3, c1, c2.

Assessment schedule:

Assessment (1): Periodic exam	Week 7
Assessment (2): Activity	Week 5,6
Assessment (3): Practical exam	Week 12,13
Assessment (4): Final written exam	Week 15
Assessment (5): Oral exams	Week 15

Weighting of Assessment:

Assessment method	Marks	Percentage
Periodic exam	10	10%
Activity	5	5%
Practical exam	20	20%
Final written exam	50	50%
Oral exam	15	15%
TOTAL	100	100%

G- Facilities Required for Teaching and Learning:

- Black (white) board, Data show, Computers, a biostatistics program.

H- List of References:

1- Course Notes: Student book of bioassay – 1 approved by pharmacology and toxicology department.

- Practical notes of bioassay-1 approved by the Pharmacology and

Toxicology Department.

2- Essential books:

- i- A Practical Approach to Using Statistics in Health Research: From Planning to Reporting, 1st ed, 2018).
- ii. Bioassay Techniques for Drug Development; Atta-ur-Raham, Iqbal Choudhary M. and Thomson W.J.; Hardwood academic (2001).
- iii- Essential Medical Statistics (second edition); Kirkwood B.R., Sterne J.A.C.; Blackwell Science Inc, Main street, USA (2003).
- iv. Clarke's Isolation and Identification of Drugs (second edition); Moffat A.C., Jackson J. V., Moss M. S., widdop B.; London The Pharmaceutical Press (1986).

3- Recommended books:

- i- Lippincott illustrated reviews-pharmacology (six edition) (2009).

4- Periodicals and websites:

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

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

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Course Coordinator: Assistant Prof.Dr. Waleed Barakat

Head of Department: Prof.Dr. Mona Foad.

Date: تم مناقشة و اعتماد توصيف المقرر من مجلس القسم بتاريخ / 2019/10 م

Matrix I of Bioassay-1 course

Course Contents		ILOs of Biochemistry 1 course												
		Knowledge and understanding			Professional and practical skills				Intellectual skills		General and transferable skills			
Lectures		a1	a2	a3	b1	b2	b3	b4	c1	c2	d1	d2	d3	d4
1	Biostatistics: Introduction	x												
2	Biostatistics: Descriptive statistics	x												
3	Biostatistics: Theoretical probability distributions	x												
4	Biostatistics: Hypothesis testing	x												
5	Biostatistics: Applications	x												
6	Biostatistics: Applications	x												
7	Pharmacological screening and standardization		x											
8	Animal bioassays		x											
9	Animal bioassays		x											
10	Drug Approval processes			x										
11	Design of clinical studies			x										
12	Design of clinical studies			x										
13	Revision	x	x	x										

Practical sessions		a1	a2	a3	b1	b2	b3	b4	c1	c2	d1	d2	d3	d4
14	Biostatistics				x	x	x							
15	Biostatistics				x	x	x							
16	Biostatistics				x	x	x							
17	Biostatistics				x	x	x							
18	Biostatistics				x	x	x							
19	Biostatistics				x	x	x							
20	Animal behavioural tests					x		x						
21	Animal behavioural tests					x		x						
22	Animal behavioural tests					x		x						
23	Animal behavioural tests					x		x						
20	Activity										x	x	x	x

Matrix II of Bioassay-1 course

National Academic Reference Standards (NARS)		Program ILOs	Course ILOs	Course contents	Sources	Teaching and learning methods			Method of assessment		
						Lecture	Practical session	Self learning	Written exam	Practical exam	Oral exam
2.1	Principles of basic, pharmaceutical, medical, social, behavioral, management, health and environmental sciences as well as pharmacy practice.	A2	a2	principles of Pharmacological screening and standardization	Student book Essential books	x			x		x
		A7	a1	principles of Biostatistics	Student book Essential books	x			x		x
2.4	Principles of isolation, synthesis, purification, identification, and standardization methods of pharmaceutical compounds.	A13	a2	Animal bioassays	Student book	x			x		x
2.20	Principles of proper documentation and	A39	a3	Drug Approval	Student book	x			x		x

	drug filing systems.			processes & Design of clinical studies							
2.17	Methods of biostatistical analysis and pharmaceutical calculations	A35	a1	Biostatistics	Student book	x			x		x
3.2	Handle and dispose chemicals and pharmaceutical preparations safely.	B2	b2	Biostatistics labs	Practical notes		x			x	
3.4	Extract, isolate, synthesize, purify, identify, and /or standardize active substances from different origins	B7	b1	Biostatistics labs	Practical notes		x			x	
			b4	Animal bioassays	Practical notes		x			x	
3.11	Conduct research studies and analyze the results.	B19	b3	Biostatistics			x			x	
Ex NARs	Apply proper documentation & drug filing system in pharmacy practice.	B20		Animal bioassay methods	Practical notes Internet websites						

4.5	Select the appropriate methods of isolation, synthesis, purification, identification, and standardization of active substances from different origins	C10	c2	Animal bioassays	Student book Practical notes	x	x		x		x
4.13	Analyze and interpret experimental results as well as published literature	C18	c1	Biostatistics & Activity	Student book Practical notes internet websites	x	x		x		x
5.3	Work effectively in a team	D3	d1	Activity	Internet websites			x		x	
5.4	Use numeracy, calculation and statistical methods as well as information technology tools.	D4	d3	Activity	Internet websites			x		x	

5.8	Demonstrate creativity and time management abilities	D9	d2	Activity	Internet websites			x		x	
5.9	Implement writing and presentation skills	D10	d4	activity	Internet websites			x		x	

**COURSE
SPECIFICATIONS**

Toxicology -1

**Fourth year – first Term
2019-2020**

Course specification of Toxicology-1

University: Zagazig

Faculty: Pharmacy

A- Course specifications:

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

Major or Minor element of programs: Major

Department offering the course: Pharmacology and

Toxicology Department

Academic year Level: Fourth year/ First semester

Date of specification approval: October 2019

B- Basic information:

Title: Toxicology-1

Code: PT 415

Credit Hours: ---

Lectures: 2hrs/week

Practical: 2hrs/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 explain the mechanism of toxicity, target organ and treatment with different drug groups as well as forensic chemistry applications.

2- Intended Learning Outcomes of Toxicology-1 (ILOs)

A- Knowledge and Understanding	
a1	Describe the basic mechanism of toxicity.
a2	Define forensic chemistry and its basic applications.
a3	Illustrate the response of different body systems to toxicity.
a4	Demonstrate the toxic effects of some drug groups and other agents.
a5	Describe the basic approach for the treatment of toxicity.
B- Professional and Practical skills	
b1	Handle and dispose chemicals safely
b2	Assess toxicity profiles of some xenobiotics
b3	Detect the presence of poisons in purified samples.
b4	Monitor the toxic effects of some agents on blood and tissue samples
C- Intellectual skills	
c1	Determine the risk of drug use according to the target organ of toxicity
c2	Integrate information from different sources to solve forensic chemistry problems.
D-General and Transferable skills	
d1	Work effectively as a member of teamwork
d2	Develop critical thinking , decision making and problem solving abilities

D- Contents:

Week No.	Lecture contents (2 hrs/week)	Practical session (2hrs/week)
1	- Introduction to toxicology	Dermatology cases1 (electrical burn, frost bite)
2	- Approach to treatment	Dermatology cases 2 Allergic contact dermatitis, photo allergic contact dermatitis)
3	-Heavy metals part1 (Pb – Hg)	Discussion of toxicology symptoms of ethanol,salicylates,acetone and nicotine
4	- Heavy metals part2 (Fe – Mg)	Discussion of toxicology symptoms of paracetamol, novalgin, salicylates, imipramine, quinine
5	- Heavy metals part3 (Cu – As)	Forensic tests1 (ethanol,salicylates,acetone and nicotine toxicity)
6	- Pesticides	Forensic tests2(paracetamol, novalgin, salicylates, imipramine, quinine)
7	- Midterm exam	-----
8	- Toxic effects of solvents & vapors	Tissue spots
9	- Toxic response of immune & respiratory systems	Blood spots
10	- Toxic responses of the kidney&liver	Activity cases in team work of heavy metals
11	- Toxic responses of the nervous systems&eye	Activity cases in team work of pesticides, gas& vapor
12	- Toxic responses of blood	- Practical exam 1 (spots)
13	-Toxic responses of cardio vascular system	Practical exam 2 (dermatology & forensic)
14	- Animal& Food Poisoning -Forensic chemistry	
15	-Written 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- Case study in team work to assess:c2, d1, d2
- 3- Practical exams to assess: b1, b2, b3, b4
- 4- Oral exam to assess: a1, a2, a3, a4,a5,c1, c2, c3

Assessment schedule

Assessment (1): Midterm exam	Week 7
Assessment (2): Activity (case studies in team work)	Week 10,11
Assessment (3): Practical exam	Week 12 , 13
Assessment (4): Final written exam	Week 15
Assessment (5): Oral exams	Week 15

Weighting of Assessment

Assessment method	Marks	Percentage
Midterm exam	10	10%
Activity (case studies in team work)	5	5%
Practical practice & exam	20	20%
Final written exam	50	50%
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 and chemicals.

H- List of References:

1- Course Notes: Student book of Toxicology (1) approved by Toxicology and Pharmacology department (2019)

- Practical notes of Toxicology (1) approved by Toxicology and Pharmacology department (2019)

2- Essential Books:

i- Goodman & Gilman's: The pharmacological basis of therapeutics (tenth edition); Hardman, Limbird, Gillman; McGraw-Hill Companies USA.

ii- The Basic Science of Poison (fifth edition); Klassen C.; McGraw-Hill Companies USA.

iii- Illustrated Toxicology: with study questions; Gupta, Meric (2018).

3- Recommended Books:

i- Integrated Pharmacology; Curtis, Suiter, Walker, Hottman; Mosby, London, UK.

ii- Poisoning & Drug overdose (seventh edition); Olson, IK .

iii- Fundamental of toxicology.

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.

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

Course Coordinator: Ass.Prof.Dr. Shimaa El-Shazly

Head of Department: Prof.Dr. Mona Fouad

Date: 2019/ 10 / تم مناقشة و اعتماد توصيف المقرر من مجلس القسم بتاريخ

Matrix I of Toxicology-1

Course Contents		ILOs of Toxicology-1course													
		knowledge and understanding					Professional and practical skills				Intellectual skills		Transferable and general skills		
		a1	a2	a3	a4	a5	b1	b2	b3	b4	c1	c2	d1	d2	
1	Introduction to toxicology	X		X	X	X									
2	- Approach to treatment	X		X	X	X									
3	Heavy metals part1	X		X	X	X					X	X			
4	Heavy metals part2	X		x	X	X					X	X			
5	Heavy metals part3	X		x	X	X					X	X			
6	Pesticides	X		x	X	X					X	X			
7	Toxic effects of solvents & vapors	X		x	X	X					X	X			
8	Toxic responses of immune and respiratory systems	X		x	X	X					X	X			
9	Toxic responses of the kidney & liver	x			X	X					X	X			
10	Toxic responses of the eye & nervous system	x		X	X	x					X	X			

11	Toxic response of blood	x					x					X		X	
12	Toxic response of cardiovascular system	x										X		X	
13	Animal & food poisoning	X										X		X	
14	Forensic chemistry		x										x		
Practical session															
1	Dermatology cases1 (electrical burn, frost bite)						x								
2	Dermatology cases 2 Allergic contact dermatitis, photo allergic contact dermatitis)						x	x	x						
3	Discussion of toxicology symptoms of ethanol,salicylates,acetone and nicotine						x			x					
4	Discussion of toxicology symptoms of paracetamol, novalgine, salicylates, imipramine, quinine						x			x					
5	Forensic tests1 (ethanol,salicylates,acetone and nicotine toxicity)						x			x					
6	Forensic tests2(paracetamol, novalgine, salicylates, imipramine, quinine)						x			x					
7	Tissue spots						x			x	x				
8	Blood spots						x			x	x				
9	Activity cases of metals heavy						x							x	x

10	Activity cases of pesticides, gas& vapor						x							x	x	
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Matrix II of Toxicology-1course

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.	A7	a1	<ul style="list-style-type: none"> - Introduction to toxicology - Approach to treatment - Toxic effects of solvents & vapors - Toxic response of immune & respiratory systems - Toxic responses of the kidney & liver - Toxic responses of the nervous systems & eye - Toxic responses of blood -Toxic responses 	Student book Essential books	x			x		x	x

				of cardio vascular system								
			a2	-Forensic chemistry	Student book Essential books	x			x		x	x
2.16	Toxic profile of drugs and other xenobiotics including sources, identification, symptoms, management control and first aid measures.	A33, A34	a3 a4 a5	- Introduction to toxicology - Approach to treatment - Toxic effects of solvents & vapors - Toxic response of immune & respiratory systems - Toxic responses of the kidney & liver - Toxic responses of the nervous systems & eye - Toxic responses of blood -Toxic responses of cardio vascular system	Student book Essential books Student book Essential books	x			x		x	x

3.2	Handle and dispose chemicals and pharmaceutical preparations safely	B2	b1	<p>Forensic tests1 (ethanol, salicylates, acetone and nicotine toxicity)</p> <p>Forensic tests2(paracetamol, novalgine, salicylates, imipramine, quinine)</p>	Practical notes	x	x		x			
	3.7	Assess toxicity profiles of different xenobiotics and detect poisons in biological specimens	B13, B14	b2 b3 b4	<p>- Discussion of toxicology symptoms of paracetamol, novalgin, salicylates, imipramine, quinine</p> <p>Forensic tests1 (ethanol, salicylates, acetone and nicotine toxicity)</p> <p>Forensic tests2(paracetamol, novalgine, salicylates, imipramine, quinine)</p>	Practical notes	x	x		x		

4.9	Utilize the pharmacological basis of therapeutics in the proper selection and use of drugs in various disease conditions	C14	c1 c2	<ul style="list-style-type: none"> - Approach to treatment - Toxic effects of solvents & vapors - Toxic response of immune & respiratory systems - Toxic responses of the kidney & liver - Toxic responses of the nervous systems & eye - Toxic responses of blood -Toxic responses of cardio vascular system 	Student book Essential books Student book Essential books	x			x		x	x
5.3	Work effectively in a team	D3	d1	Activity cases of metals heavy Activity cases of pesticides, gas & vapor	Internet			x				

5.10	Implement writing and thinking, problem- solving and decision-making abilities	D11	d2		case study/ think- pair-share		x	x					
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Course Coordinator: Ass.Prof.Dr. Shimaa El-Shazly

Head of Department: Prof.Dr. Mona Fouad

Date: م / 2019 / 10 تم مناقشة و اعتماد توصيف المقرر من مجلس القسم بتاريخ



**COURSE
SPECIFICATIONS**

Medicinal Chemistry-3

**Fourth year – first Term
2019-2020**

Course specification of Medicinal Chemistry-3

University: Zagazig

Faculty: Pharmacy

A- Course specifications:

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

Major or Minor element of programs: Major

Department offering the course: Medicinal chemistry department

Academic year Level: Fourth year/ First semester

Date of specification approval: October 28, 2019

B- Basic information:

Title: Medicinal Chemistry-3

Code: MC412

Credit Hours:

Lectures: 2hrs/week

Practical: 2hrs/week

Tutorials: ---

Total: 3 hrs/week

C- Professional information:

1-Overall aim of the course

On completion of the course, students will be able to acquire the necessary knowledge concerning synthesis, assay, mode of action, SAR, and uses of ANS-acting drugs, CNS-acting drugs, NSAIDS& opioid analgesics.

2-Intended Learning Outcomes of Medicinal Chemistry (3) (ILOs):

A- Knowledge and Understanding	
a1	Illustrate appropriate methods of drug synthesis (ANS-acting drugs, CNS-acting drugs, NSAIDS & opioid analgesics.).
a2	Demonstrate pharmacological properties, SAR, adverse reactions, contraindications of different drug categories and drug-drug interactions (ANS-acting drugs, CNS-acting drugs, NSAIDS & opioid analgesics.).
B- Professional and Practical skills	
b1	Handle chemicals safely & effectively.
b2	Perform analysis of different medicinal dosage form.
C- Intellectual skills	
c1	Adopt GLP guidelines in handling chemicals & laboratory equipments.
c2	Perform quantitative and qualitative methodology of authentic samples.
c3	Select the most appropriate quantitative methods for assay of pharmaceutical preparations contained the mentioned drugs.
D- General and Transferable skills	
d1	Retrieve information from different sources.
d2	Work effectively as a member of a team.
d3	Write reports and present it.

D- Contents:

Week No.	Lecture (2hrs/week)	Practical session (2hrs/week)
1	-Non-steroidal antiinflammatory agents: (introduction, salicylates, p-Aminophenols, pyrazoles & derivatives, N-Arylanthranilic acid)	- Functional group analysis and their applications -Assay of prescription
2	- Aryl acetic acid derivaties. -Aryl propionic acid derivaives. - Oxicams and Uricosuric agents -Cox -2 selective inhibitors	-Titrimetric analysis
3	-Narcotic analgesics: (natural & semisynthetic narcotic analgesics) -Narcotic antagonists. -synthetic narcotic analgesics	-Assay of acetylsalicylic acid (Aspirin) in powder form -Activity(case study)
4	-Drugs acting on the autonomic nervous system: sympathomimetic agents	-Assay of acetylsalicylic acid (Aspirin)in Tablets or suppositories form
5	-Sympathomimetic agents -Parasympathomimetic agents	-Assay of paracetamol -Activity(written reports)
6	-Parasympathomimetic agents: cholinergic antagonists Adrenergic blocking agents	-Assay of Novalgin in tablets or suppositories
7	Midterm exam	
8	-Drugs acting on central nervous system: (central nervous system depressants, sedative and hypnotics)	-Assay of Novalgin in ampoule form
9	-General anesthetics Antiepileptic	- Assay of ibuprofen -Activity (case study)

10	Major tranquilizer	Assay of ketoprofen
11	Minor tranquilizer	-Assay of indomethacin
12	--Local anesthetics: (P-Aminobenzoic acid derivatives, dialkylaminoalkyl ester, amide derivatives)	-Assay of chloral hydrate
13	Central nervous system stimulants: (analeptics, antidepressants)	-Practical exam (1)
14	- Central sympathomimetic agents and psychedelics	-Practical exam (1)
15	- Final written exam.	

E- Teaching and Learning Methods:

- Lectures
- Practical sessions
- Self-learning (Internet, report writing)
- Case study.

F- Student Assessment Methods:

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

Assessment schedule:

Assessment (1): final Written exam	Week 15
Assessment (2): mid term exam	Week 7
Assessment (3): Activity	Week 3,5,9
Assessment (4): Practical exams	Week 13, 14
Assessment (4): Oral exam	Week 15

Weighting of Assessment:

Assessment method	Marks	Percentage
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Midterm exam	10	10%
Final written exam	50	50%
Activities	5	5%
Practical exam	20	20%
Oral exam	15	15%
TOTAL	100	100%

G- Facilities Required for Teaching and Learning:

- Black (white) board, Data show, laboratory equipments and chemicals.

H- List of References:

1- Course Notes: Student book of Medicinal chemistry (3) approved by medicinal chemistry department 2019

- Practical notes of Medicinal chemistry (3) approved by medicinal chemistry department 2019

2- Essential Books (Text Books)

i- Wilson & Griswold's Textbook of Organic: Medicinal and Pharmaceutical Chemistry; Wilson, Charles Owens; Beale, John Marlowe; Block, John H.; Block, John H.; Griswold, Ole; Wiley-Interscience (2011).

ii- Foye's Principles of Medicinal Chemistry; Williams, David A., William O. Foye, and Thomas L. Lemke; Lippincott Williams and Wilkins (2013).

iii- B.p. &U.S Pharmacopia (1988-2013)

3- Recommended books

An Introduction to Medicinal Chemistry; Patrick, Graham L, Oxford (2014)

4- Periodicals, Web Sites, etc

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

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

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

www.Pubmed.Com

www.sciencedirect.com

Course Coordinator: Prof .Dr. Mohamed Baraka

Head of department: Prof. Dr. Kamel Metwally

Date:

28/10/2019

تم مناقشة واعتماد توصيف المقرر من مجلس القسم المقرر بتاريخ

Matrix I of Medicinal Chemistry 3 course

Course Contents		ILOs of Medicinal Chemistry 3 course									
		Knowledge and understanding		Professional and practical skills		Intellectual skills			General and transferable skills		
		a1	a2	b1	b2	c1	c2	c3	d1	d2	d3
1	Nonsteroidal antiinflammatory agents Salicylates, p-Aminophenols, Pyrazoles & derivatives ,N-Arylanthranilic acid.	x	X				X	x			
2	Aryl acetic acid, Oxicams and Uricosuric agents	x	X				X	x			
3	Narcotic analgesics, Natural & Semisynthetic narcotic analgesics Narcotic antagonists Synthetic narcotic analgesics	x	x				X	x			
4	Drugs acting on the autonomic nervous system: Sympathomimetic agents	x	x				X	x			
5	Sympathomimetic agents Parasympathomimetic agents	x	x				X	x			

6	Parasympathomimetic agents Cholinergic antagonists Adrenergic blocking agents	x	x					X	x			
7	Drugs acting on central nervous system: (central nervous system depressants, sedative and hypnotics)	x	x					X	x			
8	General anesthetics Antiepileptic	x	x					X	x			
9	Major tranquilizer	x	x					X	x			
10	Minor tranquilizer Central nervous system stimulants Analeptics, Antidepressants		x					X	x			
11	Local anesthetics P-Aminobenzoic acid derivatives Dialkylaminoalkyl ester Amide derivatives	x	x					X	x			
12	Central nervous system stimulants: (analeptics, antidepressants)	x	x					X	x			
13	- Central sympathomimetic agents and psychedelics	x	x					X	x			

Practical sessions											
14	Titrimetric analysis			x	x	x		x			
15	Assay of acetylsalicylic acid (Aspirin)in powder form ,in Tablets or suppositories form , Novalgin in tablets or suppositories form& in ampoule form, paracetamol,indomethacin, ibuprofen,ketoprofen, chloral hydrate&prescription			x	x	x		x		x	
16	Functional group analysis and their applications			x	x	x		x			
17	Activities								x	x	x

Matrix II of Medicinal Chemistry 3 Course

National Academic Reference Standards (NARS)		Program ILOs	Course ILOs	Course contents	Sources	Teaching and learning methods			Method of assessment		
						lecture	practical session	Case study	written exam	practical exam	oral exam
2.5	Principles of drug design, development and synthesis.	A15	a1	Drugs acting on the autonomic nervous system	student book, essential books	X			x		x
				Local anesthetics	Student book	X			x		x
				Drugs acting on central nervous system	Student book	X			x		x
				Nonestroidal antiinflammatory agents	student book, essential books	X			x		x
				Narcotic analgesics	Student book	X			x		x
2.13	Pharmacological properties of drugs including mechanisms of action, therapeutic uses, dosage, contra-indications, ADRs and drug interactions.	A30	a2	Drugs acting on the autonomic nervous system	student book, essential books	X			x		x
				Local anesthetics	Student book	X			x		x
				Drugs acting on central nervous system	Student book	X			x		x

				Nonsteroidal antiinflammatory agents	student book essential books	X			x		x
				Narcotic analgesics	Student book	X			x		x
3.2	Handle and dispose chemicals and pharmaceutical preparations safely.	B2	b1	Titrimetric analysis	Practical notes		x			x	
				Assay of acetylsalicylic acid (Aspirin) in powder form, in Tablets or suppositories form, Novalgin in tablets or suppositories form & in ampoule form, paracetamol, indomethacin, ibuprofen, chloral hydrate & prescription	Practical notes		x			x	
				Functional group analysis and their applications	Practical notes		x			x	
3.4	Perform synthesis,	B7	b2	Titrimetric analysis	Practical notes		x			x	

4.3	Apply qualitative and quantitative analytical and biological methods for QC and assay of raw materials as well as pharmaceutical preparations	C6	c2	Drugs acting on the autonomic nervous system	student book	X			x		x
				Local anesthetics	student book	X			x		x
				Drugs acting on central nervous system	student book	X			x		x
				Nonsteroidal antiinflammatory agents	student book	X			x		x
				Narcotic analgesics	student book	X			x		x
		C7	c3	Drugs acting on the autonomic nervous system	student book	X			x		x
				Local anesthetics	student book	X			x		x
				Drugs acting on central nervous system	student book	X			x		x
				Nonsteroidal antiinflammatory agents	student book ,essential books	X			x		x
				Narcotic analgesics,	student book	X			x		x
				Titrimetric analysis	Practical notes		x			x	

				Assay of acetylsalicylic acid (Aspirin) in powder form, in Tablets or suppositories form, Novalgin in tablets or suppositories form & in ampoule form, paracetamol, indomethacin, ibuprofen, ketoprofen, chloral hydrate & prescription	Practical notes		x			x	
				Functional group analysis and their applications	Practical notes		x			x	
5.2	Retrieve and evaluate information from different sources to improve professional competencies	D2	d1	Activities	Practical notes/ Internet				x		
5.3	Work effectively in a team	D3	d2	Assay of acetylsalicylic acid (Aspirin) in powder form, in Tablets or suppositories form, Novalgin in tablets or suppositories form & in ampoule form, paracetamol, indomethacin, ibuprofen, ketoprofen, chloral hydrate & prescription	Practical notes		x			x	

				Activities	Practical notes/ Internet			x			
5.9	Implement writing and presentation skills	D10	d3	Activities	Practical notes/ Internet			x			

Course Coordinator: Prof .Dr. Mohamed Baraka

Head of department: Prof. Dr. Kamel Metwally

Date:

28/10/2019

تم مناقشة واعتماد توصيف المقرر من مجلس القسم المقرر بتاريخ



**COURSE
SPECIFICATIONS**

Medical Microbiology

**Fourth year – first Term
2019-2020**

Course specification of Medical Microbiology

University: Zagazig

Faculty: Pharmacy

A- Course specifications:

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

Major or Minor element of programs: Major

Department offering the program: -----

Department offering the course: Microbiology and Immunology

Academic year Level: Fourth year students

Date of specification approval: September 2019

B- Basic information:

Title: Medical Microbiology

Code: **MI413**

Lectures: 3 hrs/week

Practical: 1 hrs/week

Total: 3.5 hrs/week

C- Professional information:

1-Overall aim of the course

On completion of the course, the student will be able to Illustrate the etiology, pathogenesis, clinical picture, laboratory diagnosis as well as therapeutic regimen of different bacterial, fungal and viral diseases.

Perform the diagnostic laboratory tests for identification of the infectious agents. Specify the appropriate vaccination, treatment and preventive measures for each infectious agent. Develop the critical thinking skills and communicate efficiently with patients and health care professionals.

2- Intended Learning Outcomes of Medical Microbiology(ILOs)

A- Knowledge and Understanding	
a1	Outline the principles of host-parasite relationship and Pathogenesis of bacterial, fungal and viral diseases
a2	Illustrate the etiological agents, epidemiological aspects and clinical manifestations of different pathogenic bacteria, virus and fungi.
a3	Specify the diagnostic key elements of pathogenic bacteria, viruses and fungi.
a4	Outline the therapeutic regimen of different bacterial, fungal and viral diseases.
B- Professional and Practical skills	
b1	Handle and dispose the chemicals and the infectious contaminated materials.
b2	Perform the diagnostic laboratory tests for identification of the infectious agents.
C- Intellectual skills	
c1	Select the appropriate vaccination and preventive measures for each infectious agent.
c2	Select the appropriate medication for treatment and control of each infectious agent.
c3	Assess the experimental results for differentiation between the different etiological agents.
c4	Interpret experimental results for giving critical decision about patient's state.
D-General and Transferable skills	
d1	Communicate efficiently in oral and written manner.
d2	Acquire online search skills through writing reports and researches.
d3	Write reports and present them.
d4	Develop critical thinking and decision-making and problem solving skills.

D- Contents:

Week No.	Lecture contents (3 hrs/week)	Practical session (1hrs/week)
1	<ul style="list-style-type: none"> • Introduction to medical microbiology Host-Parasite relationship • GRAM-POSITIVE COCCI -Genus Staphylococcus - Genus Streptococci: β- hemolytic streptococci 	<ul style="list-style-type: none"> • Laboratory safety measures
2	<ul style="list-style-type: none"> • Genus Streptococci: α- hemolytic streptococci γ- hemolytic streptococci • GRAM-POSITIVE NON-SPORE FORMING RODS: <i>Corynebacterium and Listeria</i> • GRAM-POSITIVE SPORE-FORMING RODS: <i>Bacillus and Clostridium</i> 	<ul style="list-style-type: none"> • Genus <i>Staphylococcus</i>: -<i>Staph. aureus</i> -<i>Staph. epidermidis</i> -<i>Staph. saprophyticus</i>
3	<ul style="list-style-type: none"> • ACID-FAST BACILLI: <i>Mycobacteriae</i> • CELL-WALL DEFICIENT BACTERIA: <i>Mycoplasma</i> 	<ul style="list-style-type: none"> • β- hemolytic streptococci: - <i>Strept. pyogenes</i> - <i>Strept. agalactiae</i>
4	<ul style="list-style-type: none"> • OBLIGATE INTRACELLULAR BACTERIA: <i>Spirochetes, Rickettsiae and Chlamydiae</i> • GRAM-NEGATIVE COCCI: <i>Neisseria and Branhamella</i> 	<ul style="list-style-type: none"> • α- hemolytic streptococci: - <i>Strept. pneumoniae</i> - <i>Strept. viridans</i> <p>-Activity (Report)</p>
5	<ul style="list-style-type: none"> • FERMENTATIVE GRAM-NEGATIVE RODS -Family Enterobacteriaceae: -Lactose Fermenters: <i>Escherichia, Klebsiella, Enterobacter and Citrobacter</i> 	<ul style="list-style-type: none"> • γ- hemolytic streptococci: - <i>Enterococci</i> - <i>Non- enterococci</i>
6	<ul style="list-style-type: none"> • FERMENTATIVE GRAM-NEGATIVE RODS -Family Enterobacteriaceae: -Lactose Non-Fermenters: <i>Salmonella, Shigella, Proteus and Serratia</i> • Lactose Non-Fermenters: <i>Yersinia</i> • NON-FERMENTATIVE:GRAM-NEGATIVE RODS (OXIDATIVE GROUP): <i>Pseudomonas and Acinetobacter</i> 	<ul style="list-style-type: none"> • Gm +ve bacilli: - <i>Bacillus anthracis</i> - <i>Listeria monocytogenes</i> -<i>Corynebacterium diphtheriae</i>

7	<ul style="list-style-type: none"> • Midterm exam 	Midterm exam
8	<ul style="list-style-type: none"> • CURVED GRAM-NEGATIVE RODS <i>Vibrio, Campylobacter and Helicobacter</i> • GRAM-NEGATIVE UNUSUAL BACTERIA (RODS): <i>Haemophilus, Bordetella and Legionella</i> 	<ul style="list-style-type: none"> • Enterobacteriaceae - Lactose fermenters: <ul style="list-style-type: none"> - <i>Escherichia coli</i> - <i>Citrobacter spp</i>
9	<ul style="list-style-type: none"> • MISCELLANEOUS FASTIDIOUS GRAM-NEGATIVE RODS: <i>Brucella and Pasteurella</i> • OBLIGATE ANAEROBIC GRAM-NEGATIVE BACTERIA: <i>Bacteroides and Fusobacterium</i> 	<ul style="list-style-type: none"> • Enterobacteriaceae - Lactose fermenters: <ul style="list-style-type: none"> - <i>Klebsiella pneumoniae</i> - <i>Enterobacter spp</i>
10	<ul style="list-style-type: none"> • Introduction to Virology: General properties, morphology, replication, cultivation and classification of viruses • Pathogenesis of viral infections 	<ul style="list-style-type: none"> • Enterobacteriaceae -Lactose non-fermenters: <ul style="list-style-type: none"> - Genus <i>Salmonella</i> - Genus <i>Shigella</i> Activity (Report)
11	<ul style="list-style-type: none"> • Diagnosis of viral infection • Immune response to viral infection • Chemotherapy and prevention of viral diseases 	<ul style="list-style-type: none"> • Enterobacteriaceae - Lactose non- fermenters: <ul style="list-style-type: none"> - Genus <i>Proteus</i> - Genus <i>Serratia</i>
12	DNA-VIRUSES: -Small-pox virus -Herpes Viruses. RNA VIRUSES: - Polio-virus - Influenza virus Human corona virus (e.g. Common cold)	<ul style="list-style-type: none"> • Oxidative Gram-ve rods: <ul style="list-style-type: none"> - Genus <i>Pseudomonas</i> - Genus <i>Acinetobacter</i>
13	RNA VIRUSES: - Rubeola (Measles) - Mumps virus - Rubella (German measles) virus - Rabies virus Mycology: Importance of fungi - Morphology and reproduction of fungi	Final practical exam
14	-RNA VIRUSES: -Hepatitis viruses - Human Immunodeficiency Virus (HIV) - Pathogenic fungi: Superficial, Subcutaneous, Systemic and Opportunistic mycotic infections.	
15	○ Final Written exam	

E- Teaching and Learning Methods:

- Lectures
- Practical sessions
- Case study
- Report writing

F- Student Assessment methods:

- 1- Written exams to assess: a1, a2, a3, a4, c1, c2, c3, c4
- 2- written report to assess: d1, d2, d3
- 3- Practical exams to assess: b1, b2, d4
- 4- Oral exam to assess: a1, a2, a3, a4, c1, c2, c3,c4, ,d4

Assessment schedule

Assessment (1): Midterm exam	Week 7
Assessment (2): Final written exam	Week 15
Assessment (3): Activity (Report)	Week 4, 10
Assessment (4): Practical exams	Week 13
Assessment (5): Oral exams	Week 15

Weighting of Assessment

Assessment method	Marks	Percentage
Final written exam	75	50%
Midterm exam	15	10%
Activity	10	6.7%
Practical exam	30	20%
Oral exam	20	13.3% %
TOTAL	150	100%

G- Facilities required for teaching and learning:

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

• **For practical:** labs equipped with data-show, Chemicals, Autoclaves, Incubators, Ovens, Water bathes, staining dyes, microscopes, refrigerators and microbiological culture media

H- List of References:

1- **Course Notes:** Student book of **Medical Microbiology** approved by microbiology department 2019

2- Essential Books (Text Books):

i- Jawetz, Melnick and Adelberg "Medical Microbiology" 27 th edn, Appeton & Lange; London (2015).

ii- "Medical Microbiology" 17 TH EDN, BY Greenwood D, Slack R & Peuthere J. Churchill Livingstone. London (2007).

3- Recommended books:

1. Patrick R. Murray, Ken S. Rosenthal, Michael A. Pfaller. Medical Microbiology, 7th ed. (Philadelphia: Elsevier/Mosby, 2012).

2. Levinson, W. Review of Medical Microbiology and Immunology, 13th ed. LANGE REVIEW SERIES (NY: McGraw-Hill, 2014).

3. Brooks, G.F.; Carroll, K. C.; Butel, J.S.; Morse, S. A. (2007): Jawetz, Melnick and Adelberg's Medical Microbiology. 24th ed. McGraw-Hill.

4. Infectious Disease: A Clinical Short Course by F.S. Southwick, McGraw-Hill, 3rd edition, 2013.

4- Periodicals and websites:

Egyptian J. of Microbiology.

Arab J. of Laboratory Medicine

American journal of microbiology

www.Pubmed.Com

www.sciencedirect.com.

Course Coordinator: Prof. Mona Abelmoneam

Head of Department: Prof / Nehal Elsayed yousef

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

Matrix1 of Medical Microbiology

Course content		ILOs													
		Knowledge and Understanding				Professional & Practical skills		Intellectual skills				Transferable & general skills			
		a1	a2	a3	a4	b1	b2	c1	c2	c3	c4	d1	d2	d3	d4
1	Introduction to medical microbiology Host-Parasite relationship -GRAM++ve COCCI -Genus Staphylococcus - Genus Streptococci: β- hemolytic streptococci Practical: Laboratory safety measures	x	x	x	x	x	x	x	x	x					
2	Genus Streptococci: α- hemolytic streptococci γ- hemolytic streptococci -GRAM-POSITIVE NON-SPORE FORMING RODS: <i>Corynebacterium and Listeria</i> -GRAM++ve SPORE-FORMING RODS: <i>Bacillus and Clostridium</i> Practical: Genus <i>Staphylococcus</i> :		x	x	x	x	x	x	x	x					
3	ACID-FAST BACILLI: <i>Mycobacteriae</i> CELL-WALL DEFICIENT BACTERIA: <i>Mycoplasma</i>		x	x	x	x	x	x	x	x				x	

	Practical: β- hemolytic streptococci:																
4	OBLIGATE INTRACELLULAR BACTERIA: <i>Spirochetes, Rickettsiae and Chlamydiae</i> GRAM- -ve COCCI: <i>Neisseria and Branhamella</i> Practical: α- hemolytic streptococci: Activity (Report)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
5	FERMENTATIVE GRAM- -ve RODS - Enterobacteriaceae: Lactose Fermenters: <i>Escherichia, Klebsiella, Enterobacter & Citrobacter.</i> Practical: γ- hemolytic streptococci: - <i>Enterococci</i> - <i>Non- enterococci</i>	x	x	x	x	x	x	x	x	x	x						
6	FERMENTATIVE GRAM-NEGATIVE RODS -Family Enterobacteriaceae: -Lactose Non-Fermenters: <i>Salmonella, Shigella, Proteus and Serratia</i> - Lactose Non-Fermenters: <i>Yersinia</i> NON-FERMENTATIVE: GRAM--ve RODS: <i>Pseudomonas and Acinetobacter</i> Practical:	x	x	x	x	x	x	x	x	x	x						

	Gm +ve bacilli: <i>Bacillus</i> , <i>Listeria</i> , <i>Corynebacterium</i>																
7	CURVED GRAM-NEGATIVE RODS <i>Vibrio</i> , <i>Campylobacter</i> and <i>Helicobacter</i> GRAM--ve UNUSUAL BACTERIA (RODS): <i>Haemophilus</i> , <i>Bordetella</i> and <i>Legionella</i> Practical : Enterobacteriaceae: Lactose fermenters: <i>E. coli</i> & <i>Citrobacter spp</i>		x	x	x	x	x	x	x	x	x						
8	MISCELLANEOUS FASTIDIOUS GRAM-NEGATIVE RODS: <i>Brucella</i> and <i>Pasteurella</i> OBLIGATE ANAEROBIC GRAM- NEGATIVE BACTERIA: <i>Bacteroides</i> and <i>Fusobacterium</i> Practical : Enterobacteriaceae - Lactose fermenters: <i>Klebsiella</i> & <i>Enterobacter</i>		x	x	x	x	x	x	x	x	x						
10	Introduction to Virology: General properties, morphology, replication, cultivation and classification of viruses Pathogenesis of viral infections Practical : Enterobacteriaceae -Lactose non-fermenters: <i>Salmonella</i> & <i>Shigella</i> Activity (Report)	x	x		x	x		x	x	x	x	x	x	x	x		x

11	Diagnosis of viral infection. Immune response to viral infection. Chemotherapy and prevention of viral diseases Practical Enterobacteriaceae - Lactose non- fermenters: <i>Proteus & Serratia</i>	x	X	x	x	x	x	x	x	x				
12	DNA-VIRUSES: -Small-pox virus -Herpes Viruses. RNA VIRUSES: -Polio-virus -Influenza virus -Human corona virus (e.g. Common cold) Practical Oxidative Gram-ve rods: <i>Pseudomonas & Acinetobacter</i>	x	x	x	x	x	x	x	x	x				
13	RNA VIRUSES: Rubeola (Measles) Mumps virus Rubella (German measles) virus Rabies virus Mycology: Importance of fungi Morphology and reproduction of fungi	x	x	x	x	x	x	x	x	x				
14	RNA VIRUSES: -Hepatitis viruses - Human Immunodeficiency Virus	x	X	x	x	x	x	x	x	x				

	<p>(HIV) -Pathogenic fungi: Superficial, Subcutaneous, Systemic and Opportunistic mycotic infections.</p>														
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Matrix II of Medical Microbiology (2019-2020)

NARS	Program ILOs	Course ILOs	Course contents	Sources	Teaching and learning methods			Method of assessment			
					lecture	practical session	Activity	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.	[A4]Explain the principles of medical sciences (Anatomy; histology; physiology and pathology; biochemistry; parasitology; pharmacology; clinical pharmacology; therapeutics; medical microbiology; immunology and virology).	a1	Introduction to medical microbiology Host-Parasite relationship Introduction to Virology: General properties, morphology, replication, cultivation and classification of viruses Pathogenesis of viral infections Diagnosis of viral infection. Immune response to viral infection. Chemotherapy and prevention of viral diseases	Student book Essential books	x			x		x	x
2.12 Etiology, epidemiology, laboratory diagnosis and clinical features of different diseases and their pharmacotherapeutic approaches.	[A27] Illustrate etiology, epidemiology and clinical features of different diseases. [A28] Specify the laboratory diagnosis of different diseases.	a2, a3	=GRAM-POSITIVE COCCI -Genus Staphylococcus - Genus Streptococci: =GRAM POSITIVE NON-SPORE FORMING RODS =GRAM-POSITIVE SPORE-FORMING RODS =ACID-FAST BACILLI: =CELL-WALL DEFICIENT BACTERIA =OBLIGATE INTRACELLULAR BACTERIA =GRAM-NEGATIVE COCCI =GRAM-NEGATIVE	Student book Essential books	x			x		x	x

			RODS -Lactose Non-Fermenters: -Lactose Non-Fermenters =NON-FERMENTATIVE:GRAM-NEGATIVE RODS (OXIDATIVE GROUP) =CURVED GRAM-NEGATIVE RODS =GRAM-NEGATIVE UNUSUAL BACTERIA (RODS). = FASTIDIOUS GRAM-NEGATIVE RODS: =OBLIGATE ANAEROBIC GRAM-NEGATIVE BACTERIA =DNA-VIRUSES: =RNA VIRUSES =pathogenic fungi								
3.6 Monitor and control microbial growth and carry out laboratory tests for identification of infectious and non-infections in biological specimens.	[B10] Control microbial growth & handle biological specimens safely. [B11] Perform microscopical, biochemical and serological laboratory tests to diagnose infectious and non infectious disease.	b1 b2	Practical sessions	Practical book, Internet search		x			x		
4.8 Select and assess appropriate methods of infection control to prevent infections and promote public health.	[C13] Suggest the appropriate methods to prevent infections and promote health care.	c1,c2	GRAM-POSITIVE COCCI =GRAM POSITIVE NON-SPORE FORMING RODS =GRAM-POSITIVE SPORE-FORMING RODS =ACID-FAST BACILLI: =CELL-WALL DEFICIENT BACTERIA =OBLIGATE INTRACELLULAR BACTERIA =GRAM-NEGATIVE	Student book Essential book	x			x		x	x

			COCCI GRAM-NEGATIVE RODS -Lactose Non-Fermenters: -Lactose Non-Fermenters =NON- FERMENTATIVE:GRAM- NEGATIVE RODS (OXIDATIVE GROUP) =CURVED GRAM- NEGATIVE RODS =GRAM-NEGATIVE UNUSUAL BACTERIA (RODS). = FASTIDIOUS GRAM- NEGATIVE RODS: =OBLIGATE ANAEROBIC GRAM- NEGATIVE BACTERIA =DNA-VIRUSES: =RNA VIRUSES = Pathogenic fungi								
4.13 Analyze and interpret experimental results as well as published literature.	[C18] Evaluate and interpret experimental results and published literature.	c3, c4	Practical sessions	practical book & internet search		x			x		
5.1 Communicate clearly by verbal and means.	[D1] Communicate effectively with patients and other health care professionals, including both written and oral communication	d1	Activity (reports) Practical sessions	Practical book & Internet search			x	x		x	
5.4 Use numeracy, calculation and statistical methods as well as information technology tools.	[D5] Practice computer skills including word, spreadsheet, database use and internet communications.	d2	Activity (reports)	Internet search			x	x		x	

5.9 Implement writing and presentation skills.	[D10] Implement writing and presentation skills.	d3	Activity (reports)	Internet search			x	x		x	
5.10 Implement writing and thinking, problem-solving and decision-making abilities.	D11. Develop critical thinking, problem solving and decision making skills	d4	Activity Case studies	Practical book & Internet search		x		x	x	X	