Republic of Yemen

Ministry of Higher Education & Scientific Research

21 September University for Medicals and Applied Sciences

Faculty of Clinical Pharmacy

Bachelor of Clinical Pharmacy & Pharm. D.

Course Specification of

Clinical Biochemistry 1

Course Code. (03.01.215)

2022

T4: This Template is Developed and Approved by CAQA-Yemen, 2023

Prepared by:	Reviewed by:	Head of the Department:	Vice Dean for Quality affairs	Dean of College:
Dr. Ebtesam Al- Zabedi	Dr. Ghamdan AL-Tahish	Dr. -----…….	Dr. Abdulelah Thabet	Dr. Ali Alyahawi

I. General Information:

1.	Course Title:	Clinical Biochemistry 1				
2.	Course Code:	03.01.215				
3.	Credit Hours:	Credit Hours	Theory Contact Hours		Practical Contact Hours	
			Lecture	Tutorial/ Seminar	Lab	Clinical
		2	2		--	--
4.	Level/ Semester at which this Course is offered:	Level 4 / Semester 1				
5.	Pre –Requisite (if any):	Biochemistry I&II				
6.	Co –Requisite (if any):	-				
7.	Program (s) in which the Course is Offered:	Bachelor of Clinical Pharmacy & Pharm. D.				
8.	Language of Teaching the Course:	English				
9.	Location of Teaching the Course:	Faculty of Clinical Pharmacy				
10.	Prepared by:	Dr. Ebtesam Al- Zabedi				
11	Date and Number of Approval by Council:	2022				

II. Course Description:

This course is designed to introduce information about selection, evaluation, and interpret tests used for the diagnosis and monitoring diseases. The course mostly covers routine laboratory investigations related to disorders of carbohydrates, plasma proteins and amino acids, lipids and lipoprotein abnormalities, tumor markers, acid/base balance, electrolytes, and cardiac function test.

III. Course Intended Learning Outcomes (CILOs) : Upon successful completion of the course, students will be able to:		Referenced PILOs
	A. Knowledge and Understanding:	**I, P or M/A**	
a1	**Describe** the principles of laboratory tests, causes of errors and variation of lab result and the role they play in health care.		**A1**
a2	**Classify** the biochemical markers and changes in assessment of water and electrolytes balance, hydrogen ion homoeostasis, disorders of carbohydrates, proteins and amino acids, lipid and lipoprotein metabolism and tumor markers.		A1
a3	**identify** the biochemical basis of diabetes mellitus, obesity, and cardiac function test		A2
	B. Intellectual Skills:		
b1	**Integrate** knowledge of basic medical sciences such as physiology, biochemistry with the applied and clinical medical sciences such as Pathology, clinical biochemistry ...etc.		B2
b2	**Interpret** laboratory results and its correlation with clinical finding		B2
	C. Professional and Practical Skills:		
c1	**Apply** biochemistry concepts to solve clinical problems		C1, C4, C5
	D. Transferable Skills:		
d1	**Communicate** effectively with the medical team concerning the use of laboratory tests in diagnosis of diseases.		D1
d2	**Develop** the skills of information management		D3
I= Introduced, P=Practiced or M/A= Mastered/Advanced			

(A) Alignment of Course Intended Learning Outcomes (Knowledge and Understanding) to Teaching Strategies and Assessment Methods:			
	Course Intended Learning Outcomes	**Teaching Strategies**	**Assessment Strategies**
a1	**Describe** the principles of laboratory tests, causes of errors and variation of lab result and the role they play in health care.	▪ Lecture ▪ Instructor – student Interactive ▪ Office hour	▪ Exam ▪ Assignment
a2	**Classify** the biochemical markers and changes in assessment of water and electrolytes balance, hydrogen ion homoeostasis, disorders of carbohydrates, proteins and amino acids, lipidand lipoprotein metabolism and tumor markers , and clinical enzymes.	▪ Lecture ▪ Instructor – student Interactive ▪ Office hour	▪ Exam ▪ Assignment ▪ Case study
a3	**identify** the biochemical basis of diabetes mellitus, obesity, characteristic and types of tumor markers and cardiac function test.	- Lectures ● -Assignments ● - Self-learning	▪ Exam ▪ Assignment ▪ Discussion
(B) Alignment of Course Intended Learning Outcomes (Intellectual Skills) to Teaching Strategies and Assessment Methods:			
	Course Intended Learning Outcomes	**Teaching Strategies**	**Assessment Strategies**
b1	**Integrate** knowledge of basic medical sciences such as physiology, biochemistry with the applied and clinical medical sciences such as Pathology, clinical biochemistry ...etc.	▪ Interactive discussion ▪ Office hours ▪ Seminars ▪ Self-learning	▪ Quiz e ▪ Discussion
b2	**Interpret** laboratory results and its correlation with clinical finding	▪ Lecture ▪ Exercises ▪ Solving Problem Methods	▪ Solving Problem ▪ Exercises.
(C) Alignment of Course Intended Learning Outcomes (Professional and Practical Skills) to Teaching Strategies and Assessment Methods:			
	Course Intended Learning Outcomes	**Teaching Strategies**	**Assessment Strategies**
c1	**Apply** biochemistry concepts to solve clinical problems.	▪ Lecture ▪ Instructor – student Interactive	▪ Exam ▪ Assignment
(D)Alignment of Course Intended Learning Outcomes (Transferable Skills) to Teaching Strategies and Assessment Methods:			
	Course Intended Learning Outcomes	**Teaching Strategies**	**Assessment Strategies**
d1	**Communicate** effectively with the medical team concerning the use of laboratory tests in diagnosis of diseases.	▪ Self-Learning ▪ Interactive discussion ▪ Exercises	▪ Presentation ▪ Class discussion

d2	**Develop** the skills of information management	▪ Seminar ▪ Instructor–student Interactive ▪ Exercises ▪ Case study	▪ Presentation

IV. Course Contents:

A. Theoretical Aspect:

Order	Units/Topics List	Learning Outcomes	Sub Topics List	Number of Weeks	Contact Hours
1	**purpose & functionof clinical chemistry, Specific and core lab chemistry**	**a1, b1, b2, c1, d1, d2**	- General information about Clinical Biochemistry, validity and interpretation of the laboratory tests	1	2
2	**Point of care testing and sampling errors**	**a1, a3, b1, b2, c1, d2,**	- Important, Equipments & places of using of POC - Sample processing, errors in clinical laboratory,	1	2
3	**Reference values and variation in lab result**	**a1, b2 , b2, d1, d1**	- Different lab. Values related to age & conditions in clinical biochemistry - Causes of variation (pre-analytical,analytical and post analytical)	**1**	**2**
4	**Electrolytes homeostasis (Sodium and potassium balance**	**a2, b1, b2, c1, d1**	- Normal values ofbody electrolytes, distribution of sodium& potassium - Regulation of Intracellular & extracellular concentration - Hyper & hyponatremia - Hyper and hypokalemia	1	2
5	**Tumor Markers**	**a1, a2, b1, c1, d1,**	-Introduction to tumor - properties of good tumor markers - classification	**2**	**4**
6	**Disorders of Carbohydrate metabolism, diabetes mellitus, types & Tests used to diagnose and manage of diabetes mellitus**	**a1, a2, b1, b2, c1**	- Overview of carbohydrate metabolism - Glycogen Storage Diseases - Diabetes mellitus - Lab investigations to diabetes	2	4

7	**Midterm Exam**			1	2
8	**Lipid metabolism disorders Lipoproteins metabolism, lipid profile and lipid disorder**	**a1, a2, b1, c1, d1,**	- Familial hypercholesterolaemia - hypertriglyceridaemia - hyperlipoproteinaemia - Rare disorders associated with lipid metabolism - Lipid profile (total and HDL-C, LDL-C and plasma triglycerides - Interpretation of Lipid test result	2	**4**
6	**Cardiac disease**	**a1, a3, b1, b2, c1,d2**	- Heart diseases - Type of laboratory test - Lipids,Lipoproteinand clinical disorders	1	**2**
7	**Acid-base balance and disturbances, Buffers, metabolic and respiratory acidosis and alkalosis.**	**a1, a2, b1, b2, d1**	- Normal extracellular hydrogen ion concentration HCO3) - Acid Base Basics balance & oxygen transport. - Buffering system - Metabolic vs Respiratory Acidosis/Alkalosis - Acid/Base Disorders	2	4
8	**Amino acids metabolism disorders**	**a1, a2, b1, b2, d1, d2**	- Inborn Errors of Metabolism (IEM): - Disorders of amino acid metabolism,.	1	2
9	**Final Exam**	**a1, a2, a3, b1, b2, c1**		1	2
Number of Weeks /and Units Per Semester				**16**	**32**

B. Practical Aspect (Lab/Clinical) (if any):

No.	Tasks/ Experiments	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
1	-			
2	-			
Number of Weeks /and Units Per Semester		**16**	**32**	

VII. Assignments:

No.	Assignments	Week Due	Mark	Aligned CILOs (symbols)
1	Assignment	5th	2.5	a1, a2, a3, b1, b2, d1, d2
2	Case study & exercises	7th	2.5	a1, a2, a3, b1, b2, c1, d1, d2
Total			5	

VIII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	Assignments	5th	5	5%	a1, a2, a3, b1, b2, d1, d2
2	Case study	7th	5	5%	a1, a2, a3, b1, b2, c1, d1, d2
3	Midterm Exam (Theory)	8th	20	20%	a1, a2, a3, b1, b2
5	Final Exam (Theory)	Week 16	70	70%	a1, a2, a3, b1, b2
Total			100	100%	

IX. Learning Resources:

1- Required Textbook(s):

1. Clinical Chemistry. 5th edition, Marshall W.J., 2004. (ISBN 978-0723434559)
2. Textbook of Biochemistry with Clinical Correlations. T.M. Devlin Editor, Wiley-Liss, John Wiley & Sons, Inc. 7th Edition 2010 (ISBN 879 - 0 - 070 - 20106 - 0)

2- Essential References.

1. An Illustrated Colour Text in Clinical Biochemistry 3rd edition, Gaw A et al. (ISBN 978-04430726
2. Tietz Fundamental of Clinical Chemistry. 5th edition, edited by Burtis C.A. and Ashwood E.R., 20((ISBN 9780721601892)
3. Clinical Chemistry in Diagnosis and Treatment. 6th edition, Mayne P.D., 1998 (ISBN 978-034057(

3- Electronic Materials and Web Sites *etc*.

1 -Oxford journal of biochemistry.
http://jb.oxforjournal.org/

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Prepared by:	Reviewed by:	Head of the Department:	Vice Dean for Quality affairs	Dean of College:
Dr. Ebtesam Al- Zabedi	Dr. Ghamdan AL-Tahish	Dr. -----…….	Dr. Abdulelah Thabet	Dr. Ali Alyahawi

X. Course Policies: (Based on the Uniform Students' By law (2007)	
1	**Class Attendance:** Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
2	**Tardiness:** A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
3	**Exam Attendance/Punctuality:** No student shall be allowed to the exam hall after 30 minutes of the start time and shall not leave the hall before half of the exam time has passed.
4	**Assignments & Projects:** Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	**Cheating:** Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
6	**Forgery and Impersonation:** Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply**.**
7	**Other policies:** The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.

Faculty of Clinical Pharmacy

Bachelor of Clinical Pharmacy & Pharm. D.

Course Specification of

Clinical Biochemistry 1

Course Code. 03.01.215

I. Information about Faculty Member Responsible for the Course:							
Name of Faculty Member:	**Dr. Ebtesam Al- Zabedi**	**Office Hours**					
Location& Telephone No.:							
E-mail:		SAT	SUN	MON	TUE	WED	THU

2016- 2017

II. Course Identification and General Information:

11.	**Course Title:**	**Clinical Biochemistry**				
12.	**Course Code:**	03.01.215				
13.	**Credit Hours:**	**Credit Hours**	**Theory Contact Hours**		**Practical Contact Hours**	
			Lecture	**Tutorial /Seminar**	**Lab**	**Clinical**
		2	2		--	--
14.	**Level/ Semester at which this Course is offered:**	**Level 4 / Semester 1**				
15.	**Pre –Requisite (if any):**	Biochemistry I&II				
16.	**Co –Requisite (if any):**	-				
17.	**Program (s) in which the Course is Offered:**	Bachelor of Clinical Pharmacy & Pharm. D.				
18.	**Language of Teaching the Course:**	English				
19.	**Location of Teaching the Course:**	Faculty of Clinical Pharmacy				
20.	**Prepared by:**	Dr. Ebtesam Al- Zabedi				
11	**Date and Number of Approval by Council:**	2022				

III. Course Description:

This course is designed to introduce information about selection, evaluation, and interpret tests used for the diagnosis and monitoring diseases. The course mostly covers routine laboratory investigations related to disorders of carbohydrates, plasma proteins and amino acids, lipids and lipoprotein abnormalities, tumor markers, acid/base balance, electrolytes, and cardiac function test.

IV. Course Intended Learning Outcomes (CILOs) :

Upon successful completion of the Course, student will be able to:

	A. Knowledge and Understanding:
a1	**Describe** the principles of laboratory tests, causes of errors and variation of lab result and the role they play in health care.
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	B. Intellectual Skills:
b1	**Integrate** knowledge of basic medical sciences such as physiology, biochemistry with the applied and clinical medical sciences such as Pathology, clinical biochemistry ...etc.
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	C. Professional and Practical Skills:
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	D. Transferable Skills:
d1	**Communicate** effectively with the medical team concerning the use of laboratory tests in the diagnosis and treatment of diseases.
d2	**Develop** the skills of information management

V. Course Contents:

A. Theoretical Aspect:

خطأ! لم يتم العثور على مصدر المرجع.

Order	Units/Topics List	Learning Outcomes	Sub Topics List	Number of Weeks	Contact Hours
1	**purpose & functionof clinical chemistry, Specific and core lab chemistry**	**a1, b1, b2, c1, d1, d2**	- General information about Clinical Biochemistry, validity and interpretation of the laboratory tests	1	2
2	**Point of care testing and sampling errors**	**a1, a3, b1, b2, c1, d2,**	- Important, Equipments & places of using of POC - Sample processing, errors	1	

			in clinical laboratory,		2
3	**Reference values and variation in lab result**	**a1, b2 , b2, d1, d1**	- Different lab. Values related to age & conditions in clinical biochemistry - Causes of variation (pre-analytical,analytical and post analytical)	**1**	**2**
4	**Electrolytes homeostasis (Sodium and potassium balance**	**a2, b1, b2, c1, d1**	- Normal values ofbody electrolytes, distribution of sodium& potassium - Regulation of Intracellular & extracellular concentration - Hyper & hyponatremia - Hyper and hypokalemia	1	2
5	**Tumor Markers**	**a1, a2, b1, c1, d1,**	-Introduction to tumor - properties of good tumor markers - classification	**2**	**4**
6	**Disorders of Carbohydrate metabolism, diabetes mellitus, types & Tests used to diagnose and manage of diabetes mellitus**	**a1, a2, b1, b2, c1**	- Overview of carbohydrate metabolism - Glycogen Storage Diseases - Diabetes mellitus - Lab investigations to diabetes	2	4
7	**Midterm Exam**			1	2
8	**Lipid metabolism disorders Lipoproteins metabolism, lipid profile and lipid disorder**	**a1, a2, b1, c1, d1,**	- Familial hypercholesterolaemia - hypertriglyceridaemia - hyperlipoproteinaemia - Rare disorders associated with lipid metabolism - Lipid profile (total and HDL-C, LDL-C and plasma triglycerides - Interpretation of Lipid test result	2	**4**
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8	**Amino acids metabolism disorders**	**a1, a2, b1, b2, d1, d2**	- Inborn Errors of Metabolism (IEM): - Disorders of amino acid metabolism,.	1	2
9	**Final Exam**	**a1, a2, a3, b1, b2**		1	2
Number of Weeks /and Units Per Semester				**16**	**32**

B. Case Studies and Practical Aspect:

No.	Tasks/ Experiments	Number of Weeks	Contact Hours
1			
2			
Number of Weeks /and Units Per Semester		**16**	**32**

VI. Teaching Strategies of the Course:

- Lecture
- Instructor – student Interactive
- Presentation
- Office hours
- Seminar
- Assignment
- Self-Learning
- Case study

VII. Assessment Methods of the Course:

خطأ! لم يتم العثور على مصدر المرجع.

- Assignments

- Case study
- Exam
- Oral Presentation

VIII. Assignments:

No.	Assignments	Week Due	Mark
1	**Assignment**	5th	2.5
2	**Case study & exercises**	7th	2.5
Total			**5**

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