



الجمهورية اليمنية  
وزارة التعليم العالي والبحث العلمي  
جامعة ٢١ سبتمبر للعلوم الطبية والتطبيقية  
كلية الطب المخبري  
قسم الكيمياء الحيوية  
وحدة التطوير وضمان الجودة

Republic of Yemen  
Ministry of Higher Education & Scientific Research  
**21 SEPTEMBER UMAS**  
Faculty of Faculty of Laboratory medicine.  
Department of Biochemistry  
Unite of Development & Quality assurance

## Republic of Yemen

Ministry of Higher Education & Scientific Research

21 SEPTEMBER UNIVERSITY of MEDICALS & APPLIEED SCIENCES



**Faculty of Laboratory Medicine.**

**Department Of Biochemistry and Molecular Biology**

**Course Specification of Minerals Metabolism**

**Course No. (03.01.314)**

**2023/2022**



## Course name : Minerals Metabolism

I. Course Identification and General Information:					
1	Course Title:	Minerals Metabolism			
2	Course Code & Number:	03.01.314			
3	Credit Hours:	Theory Hours			Credit Hours
		Lecture	Exercise	Practical	
		2	0	2	3
4	Study Level/ Semester at which this Course is offered:	2nd Level / 2nd Semester			
5	Pre –Requisite (if any):	Biochemistry 1			
6	Co –Requisite (if any):	None			
7	Program (s) in which the Course is Offered:	Bachelor in laboratory medicine			
8	Language of Teaching the Course:	English			
9	Study System:	semester			
10	Mode of Delivery:	Regular			
11	Location of Teaching the Course:	University Campus			
12	Prepared by:	Dr. Ebtasam Al-Zadedi			
13	Date of Approval:	2022-2023			

## II. Course Description:



This course cover basic knowledge introduction, biochemical functions and Deficiency manifestations of principal elements (macroelements) and trace elements (microelements).

III. Course Intended Learning Outcomes (CILOs)		Referenced PILOs
<b>A. Knowledge and Understanding: Upon successful completion of the course, students will be able to:</b>		
a1	<b>Describe</b> the biochemical function of major elements (microelements) and trace elements (microelements).	A1
<b>B. Intellectual Skills: Upon successful completion of the course, students will be able to:</b>		
b1	<b>Interpret</b> symptoms, signs, biochemical laboratory finding of some mineral disorders	B3
C Alignment Course Intended Learning Outcomes of Professional and Practical Skills to and Assessment Strategies:		
c1	<b>Perform</b> clinical laboratory tests commonly encountered in mineral disorders	C1
<b>D. Transferable Skills: Upon successful completion of the course, students will be able to:</b>		
d1	<b>Use</b> information technology in laboratory medicine and scientific research.	D4

C. Alignment Course Intended Learning Outcomes with Teaching Strategies and Assessment methods :		
(A) Alignment Course Intended Learning Outcomes of Knowledge and Understanding to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies

a1	<b>Describe</b> the biochemical function of major elements (macroelements) and trace elements (microelements).	Lectures, Practical session	Exam Practical Exam
(B) Alignment Course Intended Learning Outcomes of Intellectual Skills to Teaching Strategies and Assessment Strategies:			
	Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
b1	<b>Interpret</b> symptoms, signs, biochemical laboratory finding of some mineral disorders	Lectures Practical session	Exam ,Practical session
C Alignment Course Intended Learning Outcomes of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:			
	Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
c1	<b>Perform</b> clinical laboratory tests commonly encountered in metabolic pathway	Lectures, Practical session	Exam Practical Exam
(D) Alignment Course Intended Learning Outcomes of Transferable Skills to Teaching Strategies and Assessment Strategies:			
	Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
d1	<b>Use</b> information technology in laboratory medicine and scientific research.	Practical session	discussion

NO .	Units/Topics List	Number of Weeks	contact hours	Learning Outcomes (CILOs)
1	Plasma protein • Classification • Function • Specific plasma protein	1	2	a 1, b1
2	- Calcium	1	2	b1
3	- Sodium	1	2	b1
4	- Potassium	1	2	b1

5	- Choleric	1	2	b1
6	phosphorus	1	2	b1
7	- Magnesium	1	2	b1
8	Med term	1	2	b1
9	- Sulfur -Iron	1	2	b1
10	- Copper	1	2	b1
11	- Zinc	1	2	b1
12	- Iodine	1	2	b1
13	- Selenium - Manganese - Cobalt	1	2	b1
14	Chromium Molybdenum - Fluoride	1	2	b1
15	Final exam	1	2	
<b>Number of Weeks /and Units Per Semester</b>		16	32	

<b>B - Practical Aspect: (if any)</b>				
Order	Tasks/ Experiments	Number of Weeks	contact hours	Learning Outcomes
1	Orientation	1	2	a1
2	Total protein & albumin estimation & calculation of globulin concentration	1	2	b1c1
3	Total protein estimation (Comparison refractometry & chemical)	1	2	b1c1
4	Case study: Water distribution and electrolytes.	1	2	b1c1
5	Case study: hyponatremia	1	2	b1c1
6	Flame photometer (components & Operation)	1	2	a1 c1
7	Flame photometer (preparation of STD) and measurement of Na.	1	2	c1d1
8	Flame photometer (preparation of STD) and	1	2	c1d1

	measurement of K.			
9	Estimation of calcium.	1	2	c1d1
10	Estimation of phosphorus.	1	2	c1d1
11	Estimation of calcium (Case study).	1	2	c1d1
12	Estimation of phosphorus (Case study).	1	2	b1c1
13	Estimation of magnesium (Case study).	1	2	b1c1
14	Final practical exam	1	2	
Number of Weeks /and Units Per Semester		14	28	

#### V. Teaching Strategies of the Course:

1-	Lectures:
2-	practical session

#### VI. Assessment Methods of the Course:

No	Assignment
1	Written Exams (Short Essays) and Quizzes
2	Written Exams (MCQ)
3	Practical Exams (PE)

#### VII. Assignments:

No.	Assessment Method	Week Due	Mark	Degree %	Aligned Course Learning
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					Outcomes
1	Midterm Exam	7 <sup>th</sup>	20	20%	a1,b1,c1
2	Practical exam	12 <sup>th</sup>	30	30%	a1,b1,c1,d1
3	Final Exam	16 <sup>th</sup>	50	50%	a1,b1,c1
Total			100	100%	

## X. Learning Resources:

### 1- Required Textbook(s) .

- 1- Ferrier Denise. Lippincott's illustrated reviews: Biochemistry, 7th edition, Wolters Kluwer. 2017.
- 2- Rodwell Victor, et al. Harper's Illustrated Biochemistry, 31th edition McGraw-Hill. 2018.

### 2- Essential References.

- 1- Biochemistry (<https://pubs.acs.org/journal/bichaw>)
- 2- Biochemical Journal (<https://portlandpress.com/biochemj>)

### 3- Electronic Materials and Web Sites *etc.*

- 1- <https://www.ncbi.nlm.nih.gov/pubmed/>  
The medical biochemistry page (online textbook) : <https://themedicalbiochemistrypage.org/>
- 2- 1. MIT open courseware. Biological Chemistry I
- 3- (<https://ocw.mit.edu/courses/chemistry/5-07sc-biological-chemistry-ifall-2013/>)
- 4- 2. MIT open courseware. Biological Chemistry II

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