Republic of Yemen

Ministry of Higher Education & Scientific Research

21 SEPTEMBER UNIVERSITY of MEDICALS & APPLIED SCIENCES

Faculty of Medicine

Bachelor Program of Medicine and Surgery

Course Specification of

Biochemistry 1

Course Code. (A21P128)

2023

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

Prepared by:	Reviewed by:	Head of department	Quality Unit:	Dean of Medicine Faculty	Center of Development and Quality Assurance Dean
Dr. Waled Al-Dubai	Dr. Nawal Alhnhinah	Dr. Nawal Alhnhinah	Dr. Fadhl Shujaa Al-deen	Dr. Salwa Al-Ghomeri	

I. General Information:

1.	Course Title:	Biochemistry 1				
2.	Course Code:	A21P128				
3.	Credit Hours:	Credit Hours	Theory Contact Hours		Practical Contact Hours	
			Lecture	Tutorial/ Seminar	Lab	Clinical
		3	2	--	2	--
4.	Level/ Semester at which this Course is offered:	First Level / First Semester				
5.	Pre –Requisite (if any):	None				
6.	Co –Requisite (if any):	None				
7.	Program (s) in which the Course is Offered:	Bachelor of Medicine & Surgery				
8.	Language of Teaching the Course:	English				
9.	Location of Teaching the Course:	Faculty of Medicine				
10.	Prepared by:	Dr. Waled Al-Dubai				
11	Date and Number of Approval by Council:	2023				

II. Course Description:

Introduction to Biochemistry course aims to provide students with basic facts about biochemistry that help students in identification of causes of many diseases. Introduction to Biochemistry focuses on structure, composition, classification, and importance of macromolecules such as carbohydrates. Lipids, proteins, nucleic acids, vitamins and enzymes.

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 composition of major nutrients, nucleic acids, enzymes , and their functions	**M**	**A1**	Describe the general and basic sciences related to human body structure and functions with emphasis on normal and abnormal conditions
a2	Classify carbohydrates. Lipids, proteins, nucleic acids, vitamins and enzymes	**M**		
a3	Identify the symptoms of major nutrients deficiency	**M**		
B. Intellectual Skills:				
b1	Integrate between causes and symptoms, of major nutrients deficiency	**A**	**B1**	Compare between normal and abnormal conditions and predict the appropriate treatment or intervention
C. Professional and Practical Skills:				
c1	Perform biochemical tests to identify and differentiate between major nutrients	**P**	**C3**	Carry out routine medical procedure and demonstrate the ability of using common medical tools required for diagnosis and management with highly qualified competency.
c2	Apply biosafety during work in the lab			
D. Transferable Skills:				
d1	Present information in a professional way	**I**	**D1**	Communicate with professionals, patients, their families and the community through verbal, written and other non-verbal means.
d2	Work effectively alone or with their colleagues	**I**	**D2**	. Work individually or in a team and develop lifelong learning using up to date technology that help in understanding the diseases

				and its control and prevention.

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 composition of major nutrients, nucleic acids, enzymes , and their functions	▪ Interactive lectures ▪ Presentation	▪ Written exam mid and final terms)
a2	Classify carbohydrates. Lipids, proteins, nucleic acids, vitamins and enzymes		
a3	Identify the symptoms of major nutrients deficiency		

(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 between causes and symptoms, of major nutrients deficiency	▪ Interactive lectures ▪ Self-learning ▪ Presentation	▪ Written exam (mid and final terms contain case study questions)

(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	Perform biochemical tests to identify and differentiate between major nutrients	▪ Practical session	▪ Final practical exam
c2	Apply biosafety during work in the lab		

(D) Alignment of Course Intended Learning Outcomes (Transferable Skills) to Teaching Strategies and Assessment Methods:

	Course Intended Learning Outcomes	Teaching Strategies	Assessment Strategies
d1	Present information in a professional way	▪ Presentation ▪ Self-learning	Assignments:

d2	Work effectively alone or with their colleagues		▪ Homework ▪ Teamwork

IV. Course Contents:

A. Theoretical Aspect:

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
1	**Carbohydrates Chemistry**	-Biochemistry and medicine -Defenation and function of carbohydrates Classification of carbohydrates and nomenclature -Monosaccharides (classification, importance, properties, derivatives) -Disaccharides (types, importance, properties) -Polysaccharides (classification, importance, properties)	3	6	a1,a2, a3, b1, d1
2	**Lipid chemistry**	-Classification of lipids -Simple lipids and their importance -Compound lipids -Phospholipids (types, structure, importance) -Glycolipds (types, structure, importance) -Lipoproteins (types, structure, importance) -Derived lipids (types, structure, importance)	3	6	a1,a2, a3, b1, d1
3	**Mid-Term Theoretical Exam**	MCQs and essay questions	1	2	a1,a2, a3, b1

4	**Proteins and nucleic acid chemistry**	-Definition and importance of proteins -Amino acids (classification , structure, properties, importance) -Structure of proteins (primary, secondary, tertiary, quaternary) -Classification of proteins with examples -Nucleic acid chemistry	5	10	a1, a2,a3, b1, d1
5	**Vitamins and Enzymes**	-Definition and classification of vitamins -Fat soluble vitamins and Water soluble vitamins (sources, structure, active forms, absorption, storage, stability, functions, deficiency and clinical manifestation , toxicity). -Definition and classification of enzymes -Cofactors -Mechanism of enzyme action -Factors that affect the rate of enzyme action -Enzymes inhibitors and isoenzymes -Clinical application of enzymes	3	6	a1,a2, a3, b1, d1
6	**Final Theoretical Exam**		1	2	a1, a2,a3, b1
Number of Weeks /and Units Per Semester			**16**	**32**	

B. Case Studies and Practical Aspect:

No.	Tasks/ Experiments	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
1	Introduction to lab safety	2	4	c2

2	-Identification of carbohydrates: Molisch's test, Iodine test, Barfoed's test Benedict's test, Seliwanoff's test Carbohydrate scheme tests	3	6	c1, c2
3	-Protein identification: Biuret test, Isoelectricpoint test, Heat and acid tests Proteins Scheme tests.	3	6	c1, c2
4	-Lipid identification tests: Test for solubility, Suden IV, Salkowski reaction, Dichromate test	3	6	c1, c2
5	- Final practical test	1	2	c1, c2
Number of Weeks /and Units Per Semester		**12**	**24**	

C. Tutorial Aspect (if any):

No.	Tutorial	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
1	None			
Number of Weeks /and Units Per Semester				

VII. Assignments:

No.	Assignments	Week Due	Mark	Aligned CILOs (symbols)
1	**Searching information about related subjects of biochemistry**	5th	10	d1,d2
Total			**10**	

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	10	10%	d1,d2

2	**Mid-Term Theoretical Exam**	7th	20	20%	a1,a2, a3,b1
3	**Final Practical Exam**	14th	20	20%	c1, c2,d2
4	**Final Theoretical Exam**	16th	50	50%	a1, a2,a3,b1
Total			**100**	**100%**	

IX. Learning Resources:

1- Required Textbook(s):

1- David, L. N., Michael, M. C (2017) Lehninger principles of biochemistry.7th edn. England: Macmillan Higher Education.

2- Victor, R.W., David, A.B., Kathleen, M.B., Peter, j. k., Anthony, P.W (2018). Harper's Illustrated Biochemistry.31st edn. United States : McGraw-Hill Education

2- Essential References:

1- Michael, L., Alisa, P (2014) Marks' Essentials of Medical Biochemistry: A Clinical Approach. 2nd edn. China: Wolters Kluwer.

2- Bhagavan, N. V., Chung-Eun Ha (2015) Essentials of Medical Biochemistry with Clinical Cases. 2nd edn. China: Academic Press..

3- Electronic Materials and Web Sites etc.:

Websites:

1- The Medical Biochemistry Page

https://themedicalbiochemistrypage.org/

Journals:

Biochemistry & Molecular Biology Journal

https://biochem-molbio.imedpub.com/

Other Web Sources:

2- Biochemistry Animations

https://maxanim.com/biochemistry/

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 Medicine

Program of Medicine

Bachelor of Medicine & Surgery

Course Plan (Syllabus) of

Biochemistry 1

Course Code. A21P128

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

2023

II. Course Identification and General Information:

1.	**Course Title:**	**Biochemistry 1**				
2.	**Course Code:**	A21P128				
3.	**Credit Hours:**	**Credit Hours**	**Theory Contact Hours**		**Practical Contact Hours**	
			Lecture	**Tutorial/ Seminar**	**Lab**	**Clinical**
		3	2	--	2	--
4.	**Level/ Semester at which this Course is offered:**	First Level / First Semester				
5.	**Pre –Requisite (if any):**	None				
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IV. Course Intended Learning Outcomes (CILOs) :

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

a1	Describe the composition of major nutrients, nucleic acids, enzymes , and their functions
a2	Classify carbohydrates. Lipids, proteins, nucleic acids, vitamins and enzymes
a3	Identify the symptoms of major nutrients deficiency

IV. Course Contents:

A. Theoretical Aspect:

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours
1	**Carbohydrates Chemistry**	-Biochemistry and medicine -Defenation and function of carbohydrates Classification of carbohydrates and nomenclature -Monosaccharides (classification, importance, properties, derivatives) -Disaccharides (types, importance, properties) -Polysaccharides (classification, importance, properties)	3	6
2	**Lipid chemistry**	-Classification of lipids -Simple lipids and their importance -Compound lipids -Phospholipids (types, structure, importance) -Glycolipds (types, structure, importance) -Lipoproteins (types, structure, importance) -Derived lipids (types, structure, importance)	3	6
3	**Mid-Term Theoretical Exam**	MCQs and essay questions	1	2
4	**Proteins and nucleic acid chemistry**	-Enzymes and coenzymes of oxidation-reduction reactions -Electron transport chain -ATP synthase -Inhibitors of oxidative phosphorylation and uncouplers	5	10

		-Free radicals and antioxidants -Oxidative stress -Free radicals and diseases		
5	**Vitamins and Enzymes**	-Definition and classification of vitamins -Fat soluble vitamins and Water soluble vitamins (sources, structure, active forms, absorption, storage, stability, functions, deficiency and clinical manifestation , toxicity). -Definition and classification of enzymes -Cofactors -Mechanism of enzyme action -Factors that affect the rate of enzyme action -Enzymes inhibitors and isoenzymes -Clinical application of enzymes	3	6
6	**Final Theoretical Exam**	MCQs and essay questions	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	Introduction to lab safety	2	4
2	-Identification of carbohydrates: Molisch's test, Iodine test, Barfoed's test Benedict's test, Seliwanoff's test Carbohydrate scheme tests	3	6
3	-Protein identification: Biuret test, Isoelectricpoint test, Heat and acid tests	3	6

	Proteins Scheme tests.		
4	-Lipid identification tests: Test for solubility, Suden IV, Salkowski reaction, Dichromate test	3	6
8	- Final practical test	1	2
Number of Weeks /and Units Per Semester		**12**	**24**

C. Tutorial Aspect:

No.	Tutorial	Number of Weeks	Contact Hours
1	None		
Number of Weeks /and Units Per Semester			

VI. Teaching Strategies of the Course:

خطأ! لم يتم العثور على مصدر المرجع.

VII. Assessment Methods of the Course:

خطأ! لم يتم العثور على مصدر المرجع.

		Assignments	
1	**Searching** information about related subjects of biochemistry	**5th**	**10**
Total	**10**		

XI. Course Policies: (Based on the Uniform Students' Bylaw (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.
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