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 Enzymes and Vitamins
Course No. (03.01.316)
2023/2022

Course name : Enzymes and Vitamins

I. Course Identification and General Information:

1	**Course Title:**	Enzymes and Vitamins			
2	**Course Code & Number:**	03.01.316			
3	**Credit Hours:**	**Theory Hours**			
		Lecture	**Exercise**	Practical	**Credit Hours**
		2		2	3
4	**Study Level/ Semester at which this Course is offered:**	3th Level / 1st Semester			
5	**Pre –Requisite (if any):**	Medical Biochemistry 1 (introduction)			
6	**Co –Requisite (if any):**	Basic biochemistry			
7	**Program (s) in which the Course is Offered:**	Faculty of 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.Nawal Al-Henhena			
13	**Date of Approval:**	2022-2023			

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II. Course Description:

The course describe the basic knowledge in the Structure, Classification and Biological functions of Enzymes **and** vitamins.

III. Alignment Course Intended Learning Outcomes with program outcomes

III. Course Intended Learning Outcomes (CILOs)		Referenced PILOs
A. Knowledge and Understanding: ***Upon successful completion of the course, students will be able to:***		
a1	Describe the nature of enzymes and definitions of terms related to enzymology (Allosteric site of the enzyme, Coenzymes, Co-factors, activators, and inhibitors) and point out diseases produced by vitamins deficiency.	**A1**
B. Intellectual Skills: ***Upon successful completion of the course, stud-ents will be able to:***		
b1	Integrated and Correlate causes, effects of diseases dependent on knowledge of enzyme and vitamin deficiency.	**B1**
C. Professional and Practical Skills: ***Upon successful completion of the course, students will be able to:***		
c1	**Perform** chemical tests to study the properties of vitamins and enzymes	**C1**
D. Transferable Skills: ***Upon successful completion of the course, students will be able to:***		
d1	Write reports and essay on the different scientific items in the field of biochemistry	**D1**

IV. 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	**Describe** the nature of enzymes and definitions of terms related to enzymology (Allosteric site of the enzyme, Coenzymes, Co-factors, activators, and inhibitors) and point out diseases produced by vitamins deficiency.	Lectures	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	**Integrated** and **Correlate** causes, effects of diseases dependent on knowledge of enzyme and vitamin deficiency.	Lectures	Exam
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	**Perform** chemical tests to study the properties of vitamins and enzymes	Practical session	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	**Write** reports and essay on the different scientific items in the field of biochemistry	Practical session	seminars

V. Course Content:

A – Theoretical Aspect:

NO.	Units/Topics List	Sub Topics List	Number of Weeks	contact hours	Learning Outcomes (CILOs)
1	Introduction, Definition and Classification of enzymes.		1	2	a1
2	-Factors affecting enzyme activity -Salient features of active site.		1	2	a1,b1

	-Enzyme Inhibition -Mechanism of Enzyme Action				
3	Regulation of enzyme activity in the living system Units and It's applications **Coenzymes**: Introduction, definition & function with examples **Isoenzymes**: Introduction, definition and it's features. Isoenzymes of LDH		1	2	a1,b1
4	**Diagnostic Importance of Enzymes (Clinical enzymology)** • Location of enzymes		1	2	b1
5	• Liver enzymes		1	2	b1
6	• Muscle enzymes		1	2	b1
7	• Cardiac enzymes		1	2	b1
8	MED TERM		1	2	b1
9	• Bone enzymes		1	2	b 1
10	• Use of enzymes as diagnostic tools, reagents and enzyme immunoassay methods		1	2	d1
11	• Water-soluble vitamins : • Daily requirement and diseases related to fat-soluble vitamin deficiency •List dietary sources and RDA of each of the vitamins. •Describe physiological roles of all vitamins.		1	2	a1
12	Define vitamins Functions of vitamins Classification vitamins		1	2	a1
13	Fat-soluble vitamins **:** • Fat-soluble vitamins		1	2	a1,b1
14	•List dietary sources and RDA of each of the vitamins.		1	2	a1
15	•Describe physiological roles of all		1	2	d1

	vitamins. •Deficiency manifestations of each vitamins. • Daily requirement and diseases related to fat-soluble vitamin deficiency				
16	Final EXAM		1	2	
	TOTAL		16	32	

B - Practical Aspect: (if any)

Order	Tasks/ Experiments	Number of Weeks	contact hours	Learning Outcomes
1	**Introduction of enzymes and Factors affecting on enzyme activity**	**1**	**2**	**a1, b1**
2	**GOT**	**1**	**2**	**c1,d1**
3	**GPT**	**1**	**2**	**c1,d1**
4	**CK**	**1**	**2**	**c1,d1**
5	**ALP**	**1**	**2**	**d1,1c**
6		**1**	**2**	**c1.d1**

	GGT			
7	**amylase**	**1**	**2**	**c1,d1**
8	**lipase**	**1**	**2**	**c1,d1**
Number of Weeks /and Units Per Semester		**8**	**16**	

V. Teaching Strategies of the Course:	
1-	Lectures
2-	Practical session
3-	Seminars

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	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	**Midterm Exam**	8	20	20%	a1, ,b1, ,c1
2	**Practical exam**	12	30	30%	a1, ,b1, ,c1,d1
3	**Final Exam**	16	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

XI. *Course Policies:*	
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:** -If the student dose not attend for more than 6 times, the student will be obligated to withdrew from the course
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