هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

2023
TP-153

Course Specification
(Bachelor)

Course Title:	Principles of Biochemistry
Course Code:	BCHM111
Program:	MBBS
Department:	biochemistry
College:	Health colleges
Institution:	Northern Border University
Version:	1
Last Revision Date:	13-2-2024

Table of Contents

A. General information about the course:

1. Course Identification

1. Credit hours: 3 (2+1)					
2. Course type					
A.	☐University	☒ College	☐Department	☐Track	☐Others
B.	☒ Required		☐Elective		
3. Level/year at which this course is offered: First year- 2nd level					
4. Course general Description:					
This course gives the student a brief description about the types of chemical bonds and solutions, expression of concentrations as an introduction to understand the principles of biochemistry to all health college students. It focuses on the structure and biological functions of carbohydrates, lipids, and proteins. Also, it describes the chemical nature, mechanism of enzymes action. However, many clinical conditions as a result of vitamins and mineral deficiencies will be also discussed. On the other hand, the course also discusses the classification of hormones and illustrates the structure and function of nucleic acids. Finally, the course outlines the main metabolic pathways of different macromolecules.					
5. Pre-requirements for this course (if any)**:**					
6. Pre-requirements for this course (if any)**:**					
7. Course Main Objective(s):					
a) Identification of types of bonds, types of solutions, and expression of concentrations **b) Recognize the different biochemical components of human bodies e.g. carbohydrates, proteins, lipids, vitamins, nucleic acids and minerals.** **c) Describe the chemical nature, classification & mechanism of enzyme action** **d) Recognize the different diseases caused by vitamin and minerals deficiency** **e) Illustrate the overview of metabolism of different macromolecules** **f) Describes the structure of DNA and RNA** **g) Identification of unknown carbohydrates and proteins solutions.** h) **Demonstrate the different biochemical techniques e.g., Colorimeter & spectrophotometer and HPLC.**					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	**48**	**100%**
2	E-learning		
3	Hybrid • Traditional classroom • E-learning		
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	**38**
2.	**Laboratory/Studio**	**5X2**
3.	**Field**	-
4.	**Tutorial**	-
5.	**Others (specify)**	-
Total		**48**

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	Identify the principles of physical chemistry & Describe classifications, structure, properties, , and biological functions of carbohydrates, lipids, and proteins	K1	Direct instructional (Lectures)	Written exams (MCQs & SAQs).
1.2	Recognize the mechanism of action and functions of enzymes, hormones ,	K1	Direct instructional (Lectures)	Written exams (MCQs & SAQs).

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
	vitamins and minerals, their regulatory roles in metabolism, growth, and development			
1.3	State the DNA structure as well as types of RNA	K1	Direct instructional (Lectures)	Written exams (MCQs & SAQs).
2.0	**Skills**			
2.1	Apply the common laboratory techniques used to study carbohydrates, lipids, proteins, minerals and interpret their data.	S2	Laboratory based strategies (Lab demonstration, direct instruction)	OSPE
2.2	Apply the core-writing skills to express student knowledge and ideas	S6	Homework-assignment	Assignment rubric
...				
3.0	**Values, autonomy, and responsibility**			
3.1	Employ the skill of self-learning and development through updated medical information from different approved sources	V1	Homework-assignment	Assignment rubric
3.2				
...				

C. Course Content

No	List of Topics	Contact Hours
1.	**Introduction lecture**	1
2.	Physical chemistry I (Water – types of bonds- types of reactions- law of mass action)	2
3.	Physical chemistry (alkalies and acids- pH-Buffers-acidosis and alkalosis)	1
4.	Physical chemistry (Solutions, expression of concentrations, Osmosis, diffusion, adsorption, elution, hydrotropy, surface tension)	2
5.	**Classification of carbohydrates &Structure of monosaccharaides& Isomerism**	2

6.	Derived sugars & Disaccharides (types & composition)	2
7.	Types of polysaccharides & Functions of most important polysaccharides as starch and glycogen)	1
8.	**Lipid chemistry (definition-general functions- classifications- simple lipids (**glycerol – fatty acids)	2
9.	Compound lipid (types and function)	2
10.	Derived lipids (types and functions of cholesterol)	1
11.	**Amino acids** Classification and structure	2
12.	classifications of protein (simple-conjugated)	2
13.	**Enzymes**: definitions- chemical nature- classification- mechanism of actions	2
14.	factors affecting enzyme activity- enzymes in clinical diagnosis	1
15.	**Nucleotide-** DNA structure	2
16.	Types of RNA	1
17.	**Minerals**: types –functions- deficiency	2
18.	**Fat soluble Vitamins:** types- functions-deficiency	2
19.	**Water soluble Vitamins:** types- functions-deficiency	3
20.	**Hormones**: definition- classification- types of receptors- types of action	2
21.	**Metabolism:** Definition of catabolism- anabolism- digestion and absorption of carbohydrates, lipid and proteins	5
22.	**Practical 1**: safety measures and precautions	1x2
23.	**Practical 2**: pH & Solution concentration (N&M)	1x2
24.	**Practical 3**: calorimetry and calcium estimation	1x2
25.	**Practical** 4: Identification of unknown carbohydrate solution	1x2
26.	**Practical** 5: Identification of unknown protein solution	1x2
Total		**48**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percen48tage of Total Assessment Score
1.	Formative quiz (class test)	6th	-------
2.	Midterm	8th	25%
3.	Assignment	10th	15%
4.	Formative final written	12th	
5.	Formative OSPE	14th	

No	Assessment Activities *	Assessment timing (in week no)	Percen48tage of Total Assessment Score
6	OSPE	16th	20%
7	Final exam	17th -18th	40%

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	Lippincott's Illustrated Reviews of Biochemistry, 7th edition (2017): Richard A. Harvey, & Denise R. Ferrier. Lippincott's Williams & Wilkins.
Supportive References	Harpers Illustrated Biochemistry: 31st Edition (2018): Victor W. Rodwell, David Bender. The McGraw Hill Education.
Electronic Materials	https://www.acb.org.uk/our-resources/biochemistry.html https://www.asbmb.org/education/online-teaching/online-lab-work https://biochem.oregonstate.edu/content/biochemistry-free-and-easy - other websites updated each year
Other Learning Materials	Department lectures power points.

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	a. There are two classrooms for 1st year students; each includes 30 seats and contains an appropriate data show. b. The Biochemistry lab is accommodated for 30 students.
Technology equipment (projector, smart board, software)	a. Data show projectors. b. Smart Board c. Laptops
Other equipment (depending on the nature of the specialty)	a. Spectrophotometers b. Colorimeters c. Variable automatic pipettes d. pH meters

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students	Indirect assessment
Effectiveness of Students assessment	Instructor	Direct assessment
Quality of learning resources	Students	Indirect assessment
The extent to which CLOs have been achieved	Instructor Students	Direct assessment Indirect assessment
Other		

Assessors (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	**MEDICAL BIOCHEMISTRY DEPARTMENT COUNCIL**
REFERENCE NO.	**4TH MEETING -1445**
DATE	**13-2-2024**