

SECTION 11: HUMAN BIOCHEMISTRY

11.1 Course Syllabi

11.1.1 Course Title:	Human Biochemistry
11.1.2 Course no:	NHB 7203
11.1.3 No. of Credits:	Sem 1: Theory 2 + Practical 1 + 0= 3
11.1.4 Course Prerequisites:	First Year courses
11.1.5 Name of the faculty:	Dr. Arnel Banaga Salgado (Theory) Ms. Israa A.M. Abuijlan (Practical)
11.1.6 Office hours:	08:30 am to 05:00 pm
11.1.7 Course Duration and Sequence	

Year	Semester	
First		
Second	III	
Third		
Fourth		

11.2 Course Catalog:

NHB 7203:Human Biochemistry (Semester I)

(2-1-0=3)

This is a system based introductory biochemistry course dealing with the basic concepts of bio molecules such as carbohydrates, lipids, proteins, enzymes and the functioning of musculoskeletal, gastrointestinal, blood, respiratory, cardiovascular, excretory, and endocrine systems. The students are also exposed to the fundamental aspects of molecular biology and its relation to the causes of common diseases.

11.3 Learning Outcomes:

11.3.1 General

The student shall be able to incorporate the knowledge of biochemistry in comprehending the disease processes and for planning comprehensive nursing care for patients

11.4 Specific

11.4.1 Knowledge: (K)

On successful completion of the course the student will be able to:

1. Explain the structure and function of eukaryotic cell and enumerate the interrelationship of biomolecules and enzymes along with consequences of deviation from normal.
2. Relate the steps of synthesis, degradation and the biochemical importance of heme, glycogen, body buffers and its relation to the homeostasis and unhealthy responses.
3. Summarize the role of liver, as the central organ for metabolic regulation and interpret (organ) liver function tests.
4. Contrast the steps of synthesis, degradation and the biochemical importance of lipids and its relation to atherosclerosis.
5. Describe the mechanisms that justify human inheritance and apply its knowledge in interpreting various genetic diseases.
6. Explain the structure, synthesis, mechanism of action of hormones like insulin and its role in Common hormonal disorders and metabolic syndromes like diabetes mellitus.

11.4.2 Skills: (S)

On successful completion of the course the student will be able to:

1. Demonstrate the skills in performing various selected qualitative and quantitative diagnostic investigations.
2. Demonstrate the ability to interpret patient's laboratory data in disease conditions.

11.4.3 Competence: (C)

On successful completion of the course the student will be able to:

Autonomy and responsibility: (AR)

1. Demonstrate initiatives to learn, self-evaluate, communicate and discuss with peers & faculty for self-improvement.
2. Use good communication skills and team work in understanding the basic knowledge of the disease and diagnosis

Role in context: (RC)

1. Utilize the biochemical basis of diseases and accurate diagnostic reports of patients to plan, implement and evaluate nursing care.
2. Communicate compassionately and effectively with patients, their families, colleagues and others with whom he/she must exchange information in carrying out their responsibilities.

Self- development: (SD)

1. Practice professionalism with ethical standards and social responsibility in all aspects of nursing practice.

11.5 Course Plan

11.5.1 Course content

We ek	Topic	Sub Topic: Content	CLOs	Teachin g Methods	Evaluat ion Method s
1	Introductio n	<ul style="list-style-type: none"> Definition of human biochemistr y Importance of biochemistr y to nursing 	K1,AR1,RC1,SD1	Lectur e cum Interac tive Discus sion	Quiz
2-3	Basic Concepts	<ul style="list-style-type: none"> Cell biology and biochemist ry Definition, structure and function; relationship between cell biology and Biochemistr y Biomolecule s <ol style="list-style-type: none"> Carbohy drates - Chemist ry of carbohy drates, Lipids - Chemist ry of lipids Proteins - Amino 	K1, K2,S1,S2,AR1,AR2,RC 1,RC2,SD1	Lectur e cum Interac tive Discus sion CBL Practic al	

		acid: Chemistry, Chemistry of proteins iii. Enzymology: Properties, classification, mechanism and factors effecting enzyme action, inhibition, , regulation and isoenzymes.			
4-5	Respiratory system	<ul style="list-style-type: none"> • TCA cycle • Electron Transport Chain • Oxidative phosphorylation 	K2,K3, S1,S2,AR1,AR2,RC1,RC2,SD1	Lecture cum Interactive Discussion	
6-7	Blood	<ul style="list-style-type: none"> • Glycolysis, • 2,3 DPG • Pentose phosphate pathway of NADPH • Hem synthesis and degradation 	K2,K3, S1,S2,AR1,AR2,RC1,RC2,SD1	Lecture cum Interactive Discussion Practical	TBL– 1

8	Musculoskeletal system	<ul style="list-style-type: none"> Glycogen and calcium metabolism 	K2, K3, S1, S2, AR1, AR2, RC1,RC2,SD1	Lecture cum Interactive Discussion	
9	Gastrointestinal System	<ul style="list-style-type: none"> Liver as the central organ for metabolic regulation 	K2, K4, S1, S2, AR1, AR2, RC1, RC2, SD1	Lecture cum Interactive Discussion Practical	
10-11	Cardiovascular system	<ul style="list-style-type: none"> Cholesterol, ketone body and lipoprotein metabolism. 	K2, K5, S1, S2, AR1, AR2, RC1, RC2, SD1	Lecture cum Interactive Discussion Practical	
12	Excretory system	<ul style="list-style-type: none"> Conjugate Acid Base Pairs, Blood Buffers, Regulation of blood pH and disorders of acid - base imbalance, disposal of nitrogen, conversion of amino acids to specialized products. 	K2, K6, S1, S2, AR1, AR2, RC1, RC2, SD1	Lecture cum Interactive Discussion CBL	Assignment
13-14	Endocrine system	<ul style="list-style-type: none"> Structure and action of insulin, glucagon, gluconeogenesis and 	K2, S1, S2, AR1, AR2, RC1, RC2, SD1	Lecture cum Interactive Discussion	

		Diabetes mellitus		Practical	
15	Genetics (Molecular biology)	<ul style="list-style-type: none"> DNA structure and replication; RNA structure and synthesis; Biotechnology and human diseases 	K2, S1, S2, AR1, AR2, RC1,RC2,SD1	Lecture cum Interactive Discussion	
16	Revision				

11.5.2 Laboratory Content

Week	Topic	Sub Topic	CLOs	Teaching Method	Evaluation Method
1-5	Blood	<ul style="list-style-type: none"> Estimate plasma glucose, through quantitative methods. OGTT Estimate cholesterol, Ketone bodies through quantitative methods. 	S1,S2,RC1	Laboratory	OSPE
6-10	Excretory system	<ul style="list-style-type: none"> Estimate Urea creatinine through quantitative methods. Perform simple screening tests for inherited disorders. 	S1,S2,RC1	Laboratory	OSPE
10-15	Genetics (Molecular biology)	<ul style="list-style-type: none"> Hands on experience of DNA extraction Identify various methodologies for 	S1,S2,RC1	Laboratory	OSPE

		estimation of hormones			
16	Revision				

11.6 Grading System

Sr. No.	Evaluation	Weightage
1	Continuous assessment (I,II- Best one)	30%
2	Written assignment / presentation	15%
3	Team Based Learning	15%
4	Quiz	10%
5	Practical (OSPE)	30%
	Total (continuous assessment)	100%
	Final grading:	
	Continuous assessment	60%
	Comprehensive exam	40%
	Total	100%

11.7 Recommended Text books

Author	Title	Published Year & Ed.	Publisher
Champee, P.C.,Harvey, R.A., Ferrier, D.R	Lippincott Illustrated Reviews: Biochemistry	2022 8 th Edition	Lippincott Williams Wilkins
Rodwell, Victor W	Harpers Illustrated Biochemistry	2018 31 st Ed.	McGraw Hill
Lieberman, Michael;Peet, Alisa	Marks Basic Medical Biochemistry: A clinical approach	2018 5 th Ed	Wolters Kluwer Health

11.8 Recommended References and Readings

Author	Title	Published Year & Ed.	Publisher
Ronner, Peter	Netters Essential Biochemistry	2018, 1 st Ed.	Elsevier

Hoffman, Andreas;Clokie, Samuel	Wilson and Walkers Principles and Techniques of Biochemistry and Molecular Biology	2019 8 th Ed.	Cambridge University Press
Baynes, John W; Dominiczak, Marek H	Medical Biochemistry	2019, 5 th Ed.	Mosby

11. 9 Instructional Materials and Learning Resources

1. Biochemical Journal
2. CINAHL Complete
3. The Journal of Biochemistry
4. Proquest