SECTION 11: HUMAN BIOCHEMISTRY

11.1 Course Syllabi

11.1.1 Course Title: Human Biochemistry
11.1.2 Course no: NHB 203
11.1.3 No. of Credits: Sem-I Theory 1 + Practical0.5 + 0= 1.5
11.1.4 Course Prerequisites: Semester II courses
11.1.5 Name of the faculty: Dr. Arnel Banaga Salgado
11.1.6 Place of office: 534
11.1.7 Office hours: 08:30 am to 04:30 pm
11.1.5 Course Duration and Sequence

Year	Semester	
First		
Second	III	IV
Third		
Fourth		

11.2 Course Catalog:

NHB 203:Human Biochemistry (Semester I) (1-0.5-0=1.5)
NHB 203:Human Biochemistry (Semester II) (1-0.5-0=1.5)

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: (A)

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

1. Explain the structural and functional organization of eukaryotic cell, distinguish transport mechanisms across plasma membrane and comprehend cellular respiration.
2. Compare and contrast the structure, function and interrelationship of biomolecules and enzymes along with consequences of deviation from normal.
3. Appraise the steps of synthesis, degradation and the biochemical importance of heme, glycogen and its relation to jaundice and calcium homeostasis.
4. Discuss the role of liver, as the central organ for metabolic regulation and interpret (organ) liver function tests.
5. Enumerate the steps of synthesis, degradation and the biochemical importance of lipids and its relation to atherosclerosis.
6. Distinguish various body buffers and its relation to acid- base homeostasis in the body, apply the knowledge in interpreting acid base disorders.
7. Describe the mechanisms that justify human inheritance and apply its knowledge in interpreting various genetic diseases.
8. 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: (B)

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: (C1)

1. Take initiative to learn, self-evaluate, communicate and discuss with peers & faculty for self-improvement.
2. Work effectively with peers, possessing good communication skills as a team member towards understanding the basic knowledge of the disease and diagnosis.

Role in context: (C2)

1. Appreciate the importance of biochemical basis of diseases and accurate diagnostic reports of patients & plan nursing care accordingly
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: (C3)

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

11.5 Course content

Week	Topic	Content	Teaching Method	Evaluation Method
1-2	**Introduction**	Definition of human biochemistry, importance of biochemistry to nursing	Lecture CBL	• Quiz • Continuous Assessment • Comprehensive Exam
	Basic Concepts:	• **Cell biology and biochemistry** Definition, structure and function; relationship between cell biology and Biochemistry • **Biomolecules** Carbohydrates - Chemistry of carbohydrates, Lipids - Chemistry of lipids Proteins - Amino acid: Chemistry, Chemistry of proteins Enzymology: Properties, classification, mechanism and factors effecting enzymeaction, inhibition, regulation and isoenzymes.	Lecture CBL PBL	• Quiz • Continuous Assessment • Comprehensive Exam • PBL
	Respiratory system	TCA cycle, Electron Transport Chain and Oxidative phosphorylation	Lecture CBL	• Quiz • Continuous Assessment Comprehensive Exam • Assignment
	Blood	Glycolysis, 2,3DPG, Pentose phosphate pathwayof NADPH, hem synthesis and degradation	Lecture CBL	• Quiz • Continuous Assessment Comprehensive Exam
	Musculoskeletal system	glycogen and calcium metabolism	Lecture CBL	• Quiz • Continuous Assessment • Comprehensive Exam

	Topics for practical's	• Introduction to laboratory glass ware • Identify and demonstrate the chemical properties of biological macromolecules (carbohydrates and proteins). • Blood for biochemical analysis • Instrumentation • Estimate serum proteins, calcium, through quantitative methods.	Demonstration. Hands on experience	• Continuous Assessment Test(OSPE) • Comprehensive Exam (OSPE)
	• **Semester-II**			
	Gastrointestinal System	Liver as the central organ for metabolic regulation	Lecture CBL	• Quiz • Continuous Assessment • Comprehensive Exam
	Cardiovascular system	Cholesterol, ketone body and lipoprotein metabolism.	Lecture CBL	• Quiz • Continuous Assessment • Comprehensive Exam
	Excretory system	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.	Lecture CBL	• Quiz • Continuous Assessment • Comprehensive Exam
	Endocrine system	Structure and action of insulin, glucagon, gluconeogenesis and Diabetes mellitus	Lecture CBL	• Quiz • Continuous Assessment • Comprehensive Exam • PBL

	Genetics (Molecular biology)	DNA structure and replication; RNA structure and synthesis; Biotechnology and human diseases	Lecture CBL	• Quiz • Continuous Assessment • Comprehensive Exam • Assignment
	Topics for practical	• Estimate plasma glucose, through quantitative methods. OGTT • Estimate cholesterol, Ketone bodies through quantitative methods. • Estimate Urea creatinine through quantitative methods. • Perform simple screening tests for inherited disorders. • Hands on experience of DNA extraction • Identify various methodologies for estimation of hormones.		

11.6 Recommended Text books

Author	Title	Published year	Publisher
Champee, P.C.,Harvey, R.A., Ferrier, D.R	Biochemistry	2009 4th Edition	Lippincott Williams Wilkins
Anthikad, J.	Biochemistry for nurses	2004 II edition	Jaypee Brothers
Michele liberman Marks Allan colleen Smith	Mark's Essential of medical biochemistry –A clinical approach	2006	Lippincott Williams Wilkins

11.7 Reference Text Books

Author	Title	Published year	Publisher
Chaterjea, M.N	Biochemistry for Dental/ Nursing/ Pharmacy students	2004 II Edition	Jaypee Brothers
Murray, R.K., Bender, D.a., Botham, K.M	Harper's illustrated Biochemistry	2009 28th Edition	McGrawHill
Michael, C., and Nelson, D	Lehninger Principles of Biochemistry	2008 4th Edition	Freeman