

Subject Code: BIOC 135	Subject Title: APPLIED BIOCHEMISTRY
Pre-requisite	-----NA-----

A

Teaching Scheme (Total Hours)					ASSESSMENT (Marks)				
Theory Credit	Theory lab /credit hours	Lab/clinical skill credit hours	Clinical Total hours credit	TOTAL HOURS	Internal	End semester college exam	End semester University exam	Hours	Total Marks
2	40/2			40	25		75	3	100

APPLIED BIOCHEMISTRY

PLACEMENT: II SEMESTER

THEORY: 2 credits (40 hours) (includes lab hours also)

DESCRIPTION: The course is designed to assist the student to acquire knowledge of the normal biochemical composition and functioning of human body, its alterations in disease conditions and to apply this knowledge in the practice of nursing.

COMPETENCIES: On completion of the course, the students will be able to

1. Describe the metabolism of carbohydrates and its alterations.
2. Explain the metabolism of lipids and its alterations.
3. Explain the metabolism of proteins and amino acids and its alterations.
4. Explain clinical enzymology in various disease conditions.
5. Explain acid-base balance, imbalance and its clinical significance.
6. Describe the metabolism of hemoglobin and its clinical significance.
7. Explain different function tests and interpret the findings.
8. Illustrate the immunochemistry.

COURSE OUTLINE

T – Theory

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
I	8 (T)	Describe the metabolism of carbohydrates and its alterations	Carbohydrates - Digestion, absorption and metabolism of carbohydrates and related disorders - Regulation of blood glucose - Diabetes Mellitus – type 1 and type 2, symptoms, complications & management in brief - Investigations of Diabetes Mellitus - OGTT – Indications, Procedure, Interpretation and types of GTT curve - Mini GTT, extended GTT, GCT, IV GTT - HbA1c (Only definition) - Hypoglycemia – Definition & causes	- Lecture cum Discussion - Explain using charts and slides - Demonstration of laboratory tests	- Essay - Short answer - Very short answer
II	8 (T)	Explain the metabolism of lipids and its alterations	Lipids - Fatty acids – Definition, classification - Definition & Clinical significance of MUFA & PUFA, Essential fatty acids, Trans fatty acids - Digestion, absorption & metabolism of lipids & related disorders - Compounds formed from cholesterol - Ketone bodies (name, types & significance only) - Lipoproteins – types & functions (metabolism not required) - Lipid profile - Atherosclerosis (in brief)	- Lecture cum Discussion - Explain using charts and slides - Demonstration of laboratory tests	- Essay - Short answer - Very short answer
III	9 (T)	Explain the metabolism of amino acids and proteins Identify alterations in disease conditions	Proteins - Classification of amino acids based on nutrition, metabolic rate with examples - Digestion, absorption & metabolism of protein & related disorders - Biologically important compounds synthesized from various amino acids (only names) - Inborn errors of amino acid metabolism – only aromatic amino acids (in brief) - Plasma protein – types, function & normal values - Causes of proteinuria, hypoproteinemia, hyper-gamma globulinemia - Principle of electrophoresis, normal & abnormal electrophoretic patterns (in brief)	- Lecture cum Discussion - Explain using charts, models and slides	- Essay - Short answer - Very short answer

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
IV	4 (T)	Explain clinical enzymology in various disease conditions	Clinical Enzymology • Isoenzymes–Definition & properties • Enzymes of diagnostic importance in ○ Liver Diseases–ALT, AST, ALP, GGT ○ Myocardial infarction–CK, cardiac troponins, AST, LDH ○ Muscular diseases–CK, Aldolase ○ Bone diseases–ALP ○ Prostate cancer–PSA, ACP	• Lecture cum Discussion • Explain using charts and slides	• Essay • Short answer • Very short answer
V	3 (T)	Explain acid base balance, imbalance and its clinical significance	Acid base maintenance • pH–definition, normal value • Regulation of blood pH–blood buffer, respiratory & renal • ABG–normal values • Acid base disorders–types, definition & causes	• Lecture cum Discussion • Explain using charts and slides	• Short answer • Very short answer
VI	2 (T)	Describe the metabolism of hemoglobin and its clinical significance	Heme catabolism • Heme degradation pathway • Jaundice–type, causes, urine & blood investigations (van den Berg test)	• Lecture cum Discussion • Explain using charts and slides	• Short answer • Very short answer
VII	3 (T)	Explain different function tests and interpret the findings	Organ function tests (biochemical parameters & normal values only) • Renal • Liver • Thyroid	• Lecture cum Discussion • Visit to Lab • Explain using charts and slides	• Short answer • Very short answer
VIII	3 (T)	Illustrate the immunochemistry	Immunochemistry • Structure & function of immunoglobulin • Investigations & interpretation–ELISA	• Lecture cum Discussion • Explain using charts and slides • Demonstration of laboratory tests	• Short answer • Very short answer

Note: Few lab hours can be planned for observation and visits (Less than 1 credit, lab hours are not specified separately).